TO

UNIVERSITY COMPUTING COMPANY –

SCIENTIFIC AND ENGINEERING DIVISION

Y-UCC
PL

CUSTOM

AUTHOR

, Presentation

TITLE

PRESENTATION

TO

UNIVERSITY COMPUTING COMPANY -

SCIENTIFIC AND ENGINEERING DIVISION

AT

LONG RANGE PLANNING CONFERENCE

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6. ANALYSIS OF SED OPPORTUNITIES

7. COMPETITION

8. CONCLUSION

INTRODUCTION

MANAGEMENT TRENDS

- TRAINED MANAGERS TAKING OVER D.P. RATHER THAN D.P. PEOPLE MOVING INTO MANAGEMENT

- OPERATIONS MANAGEMENT IS BECOMING MUCH MORE IMPORTANT

- COST CONTROL EMPHASIS -- D.P. PUT ON COST CENTER OR PROFIT CENTER BASIS

- EVENTUAL BREAK-UP OF D.P. EMPIRES (1980-1985)

- DECISIONS TO CHANGE EQUIPMENT TAKEN MORE SERIOUSLY

- D.P. MANAGERS DON'T WANT TO BE DRAGGED ALONG FASTER THAN THEY CAN HANDLE

PLANNING CONSIDERATIONS

- COMPLEXITY OF DECISIONS FACING D.P. MANAGEMENT IS INCREASING

- MULTIPLE APPROACHES TO DEVELOPING AND OPERATING NEW SYSTEMS

- TENDENCY TO 'FREEZE' OVER CERTAIN THRESHOLD

- 'ROOM FULL OF MINIS' NIGHTMARE (?)

- END USER DEMANDS ARE MORE STRINGENT

- NOW HAVE 'USER' MANAGERS WHO HAVE BEEN EDUCATED IN D.P.

EDP ISSUES WITH EXECUTIVES

- SECURITY 1
- COST 2
- PEOPLE PRODUCTIVITY 3
- APPLICATIONS 4
- PEOPLE AVAILABILITY 5

PERSONNEL

- SPECIALIZED JOB FUNCTION INCREASING

- REDUCTION IN DEPENDENCIES ON OPERATIONS AND DATA ENTRY STAFF

- DEVELOPMENTS/MAINTENANCE TRADE-OFFS

- LIMITING FACTOR ON GROWTH

SOURCE OF REVENUES

- BATCH AND REMOTE COMPUTING SERVICES "CREATE" NEW EDP DOLLARS

- FM, SOFTWARE PRODUCTS AND PROFESSIONAL SERVICES REPLACE IN-HOUSE EDP DOLLARS

- MOST REVENUES FOR SERVICES COMPETE WITH IN-HOUSE ALTERNATIVES

- SERVICES SOLD ON THE BASIS OF:
  - TIME
  - COST
  - CAPABILITY

REASONS FOR GROWTH

DEMAND

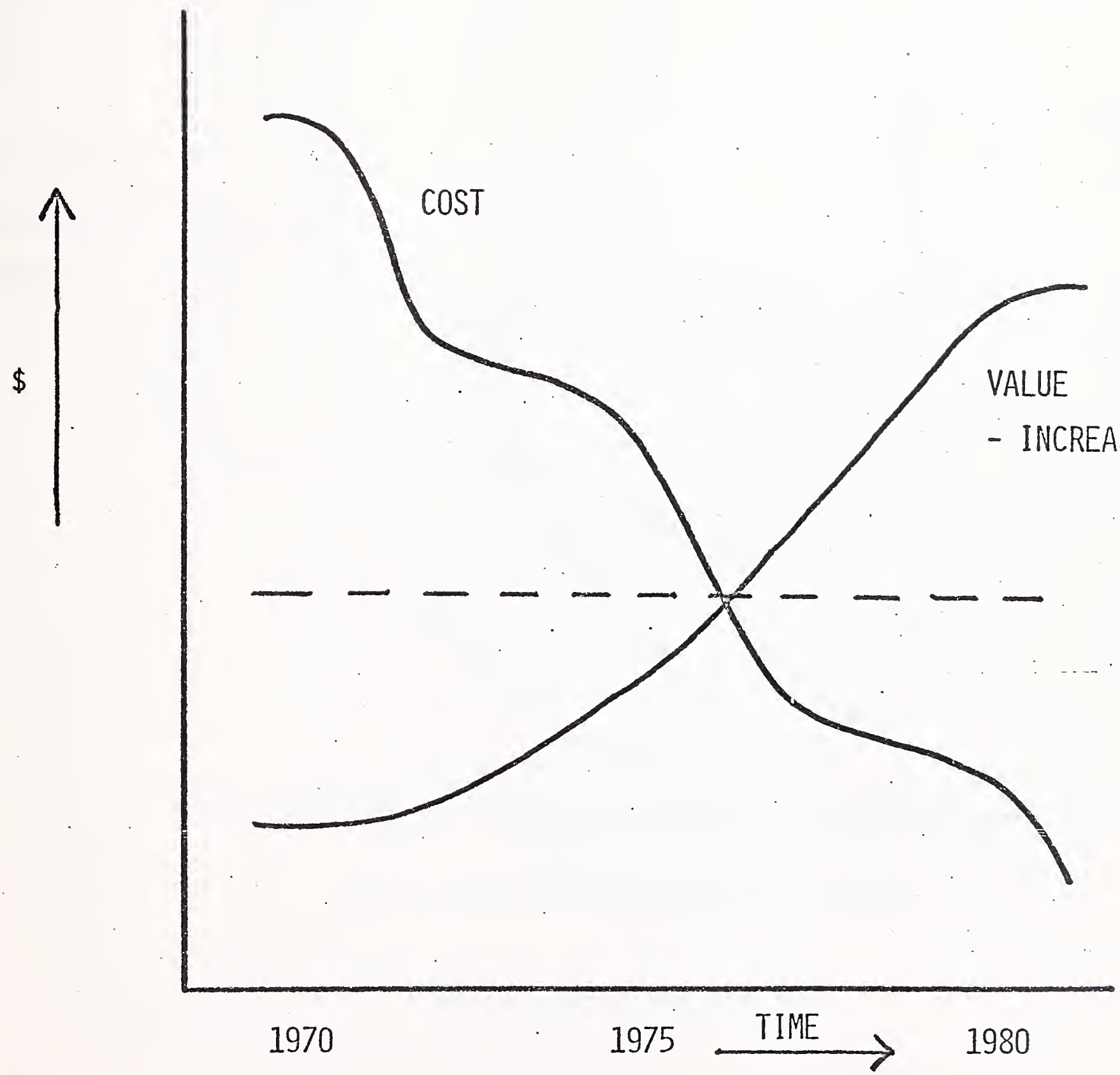
- TIME/VALUE OF INFORMATION

- INCREASING COMPLEXITY AND COST OF EDP

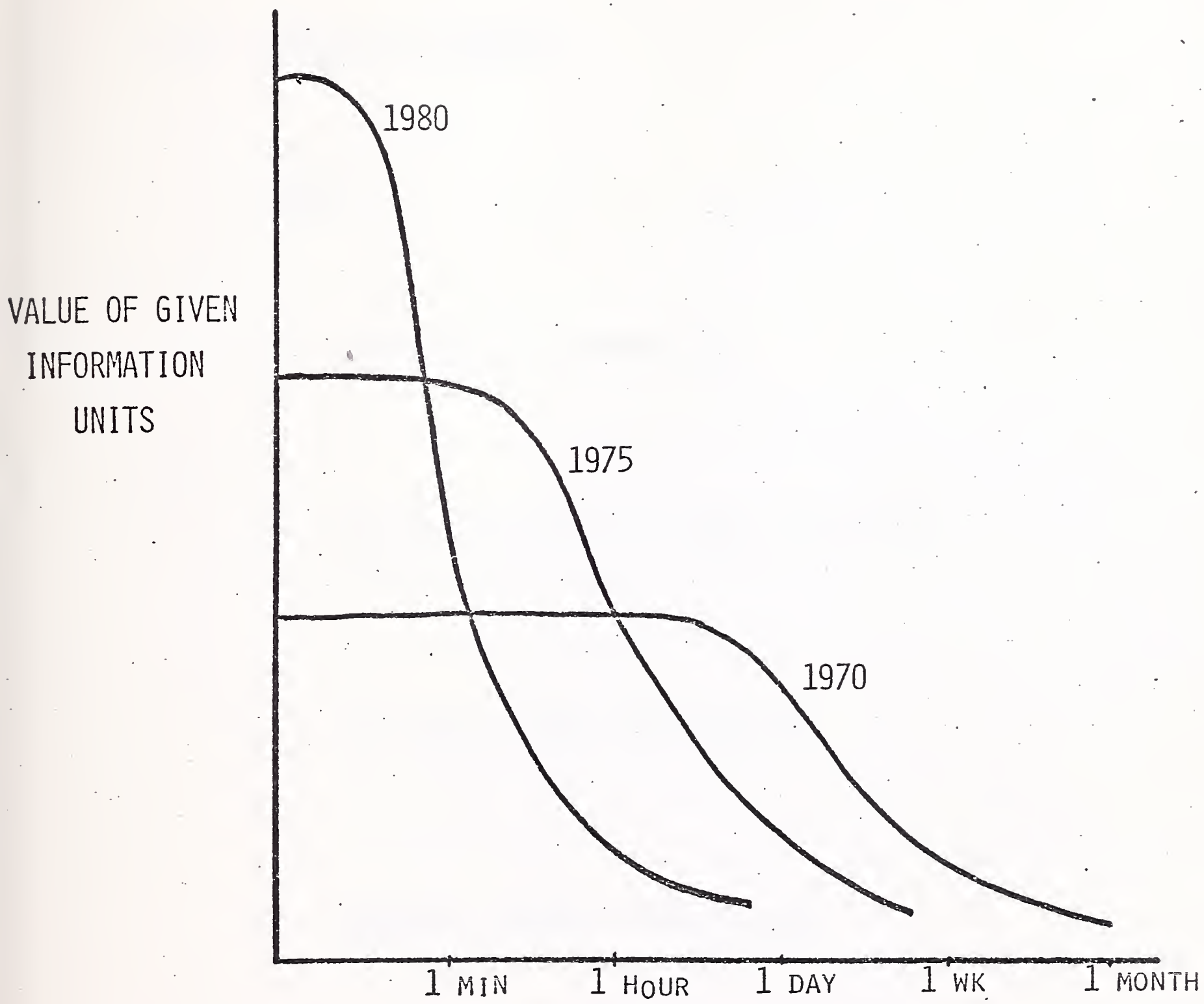
- CREATION OF "NEW" EDP DOLLARS

- CHANGING INTERNAL ORGANIZATION

- UNCERTAINITY:
  - REGULATION (PRIVACY)
  - ECONOMY
  - TECHNOLOGY



PROVISION OF INFORMATION AT GIVEN RESPONSE TIME



TIME VALUE OF INFORMATION

III. REASONS FOR GROWTH

DEMAND

- TIME/VALUE OF INFORMATION

- INCREASING COMPLEXITY AND COST OF EDP

- CREATION OF "NEW" EDP DOLLARS

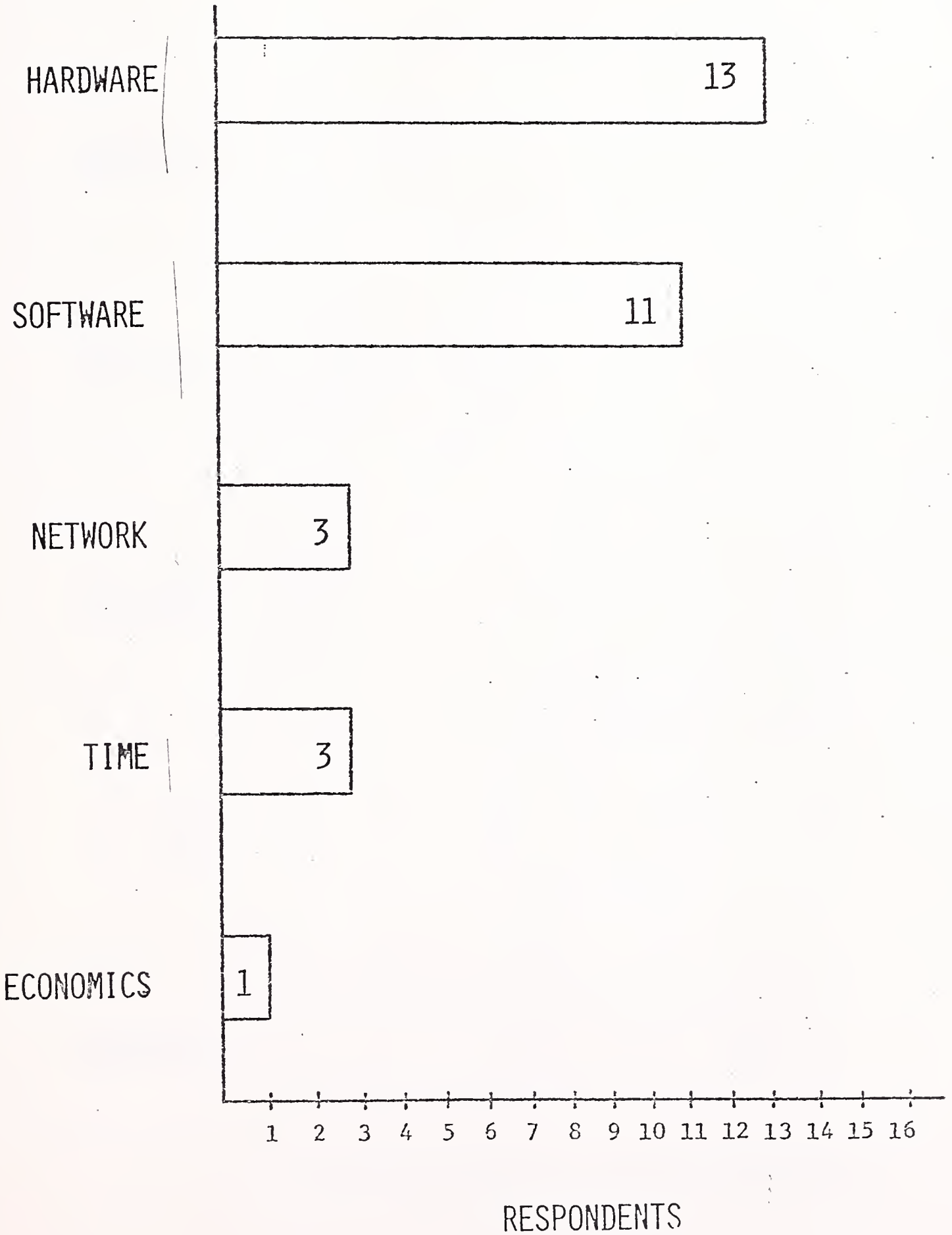
- CHANGING INTERNAL ORGANIZATION

- UNCERTAINITY:
  - REGULATION (PRIVACY)
  - ECONOMY
  - TECHNOLOGY

REASONS FOR BUYING SERVICES

- VARIES BY SIZE/TYPE OF USER
- 'ECONOMICS' MAIN REASON
- 'EXPERTISE' IS GROWING
- 'TIME' ALWAYS A FACTOR

REASONS TO USE RCS - LARGE USERS



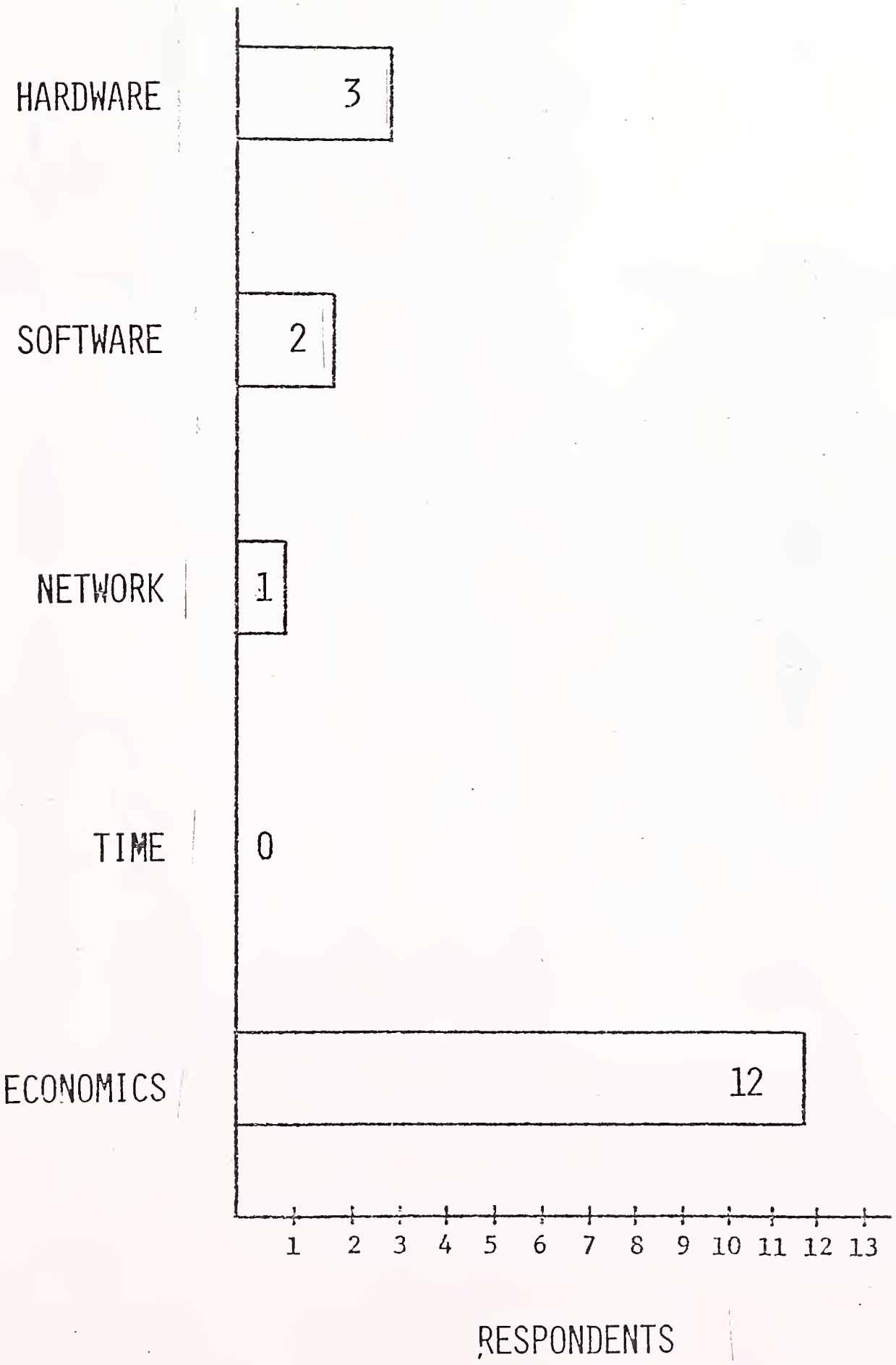
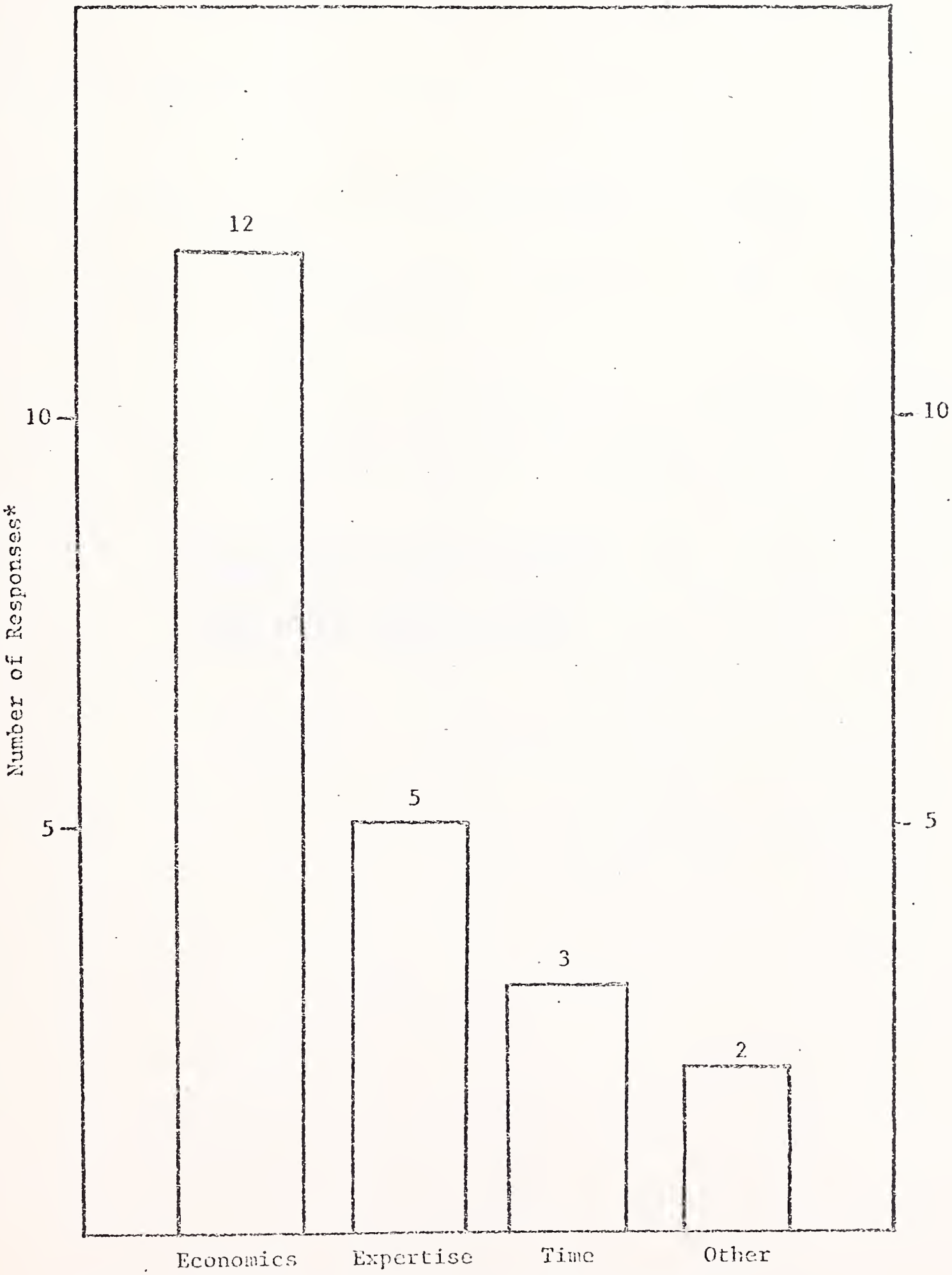

HARDWARE
3
SOFTWARE
2
NETWORK
1
TIME
0
ECONOMICS
12
1 2 3 4 5 6 7 8 9 10 11 12 13
RESPONDENTS

EXHIBIT V-40

Justification for Use of Professional Services

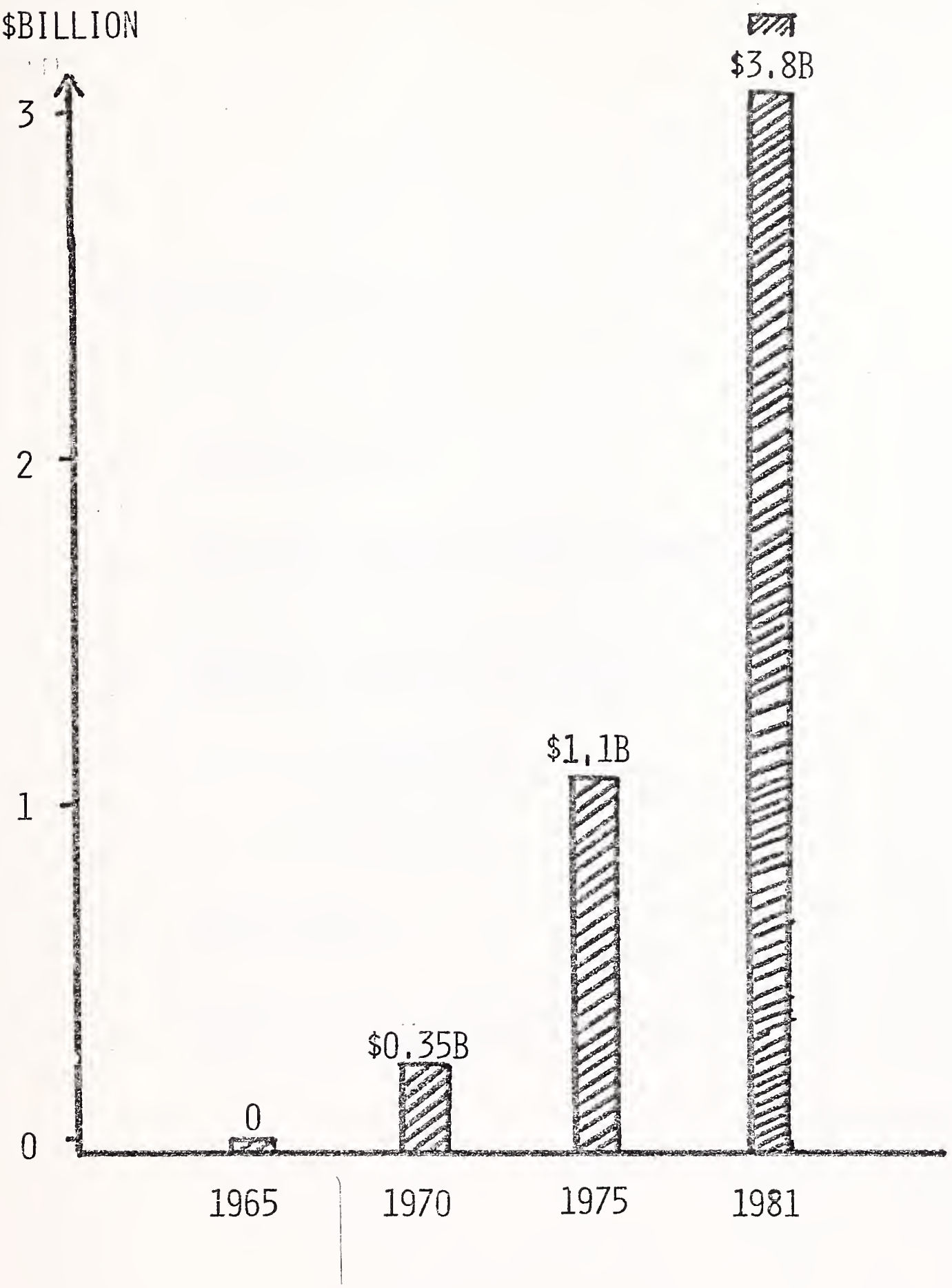


*Total is more than 19 due to multiple responses.

FUTURE DIRECTION OF REMOTE COMPUTING SERVICES (RCS)

REMOTE COMPUTING SERVICES

- WILL CHANGE TYPE OF SERVICE OVER NEXT 5 YEARS
- MORE TRANSACTION ORIENTED
- PROPRIETARY TOOLS AND DATA BASES STILL KEY
- MAJOR PROBLEMS:
  - -- EQUIPMENT SELECTION
  - -- IN-HOUSE ALTERNATIVES
  - -- KEEPING UP WITH STATE-OF-THE-ART
  - -- RISK/INVESTMENT CONCERNS IN APPLICATIONS
- SOLVE PROBLEMS -- HAVE THE CAPABILITIES AND THE PEOPLE
- USERS WILL BUY NETWORKS, ESPECIALLY ON 'SHARED NETWORK' BASIS
- LONG-TERM OUTLOOK FOR DATA ONLY NETWORKS IS POOR

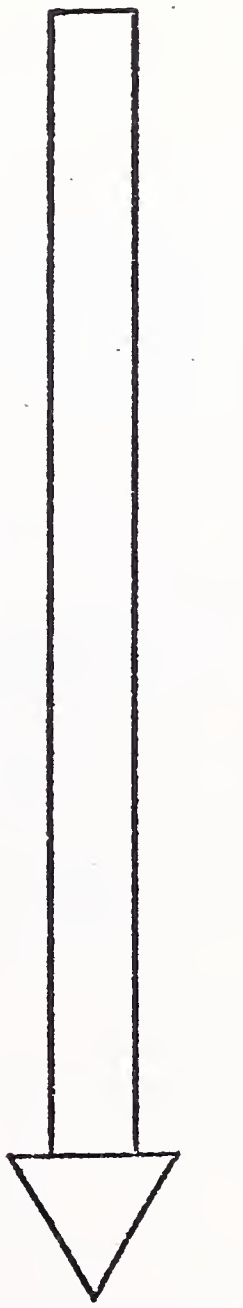


REMOTE COMPUTING SERVICES

MARKET

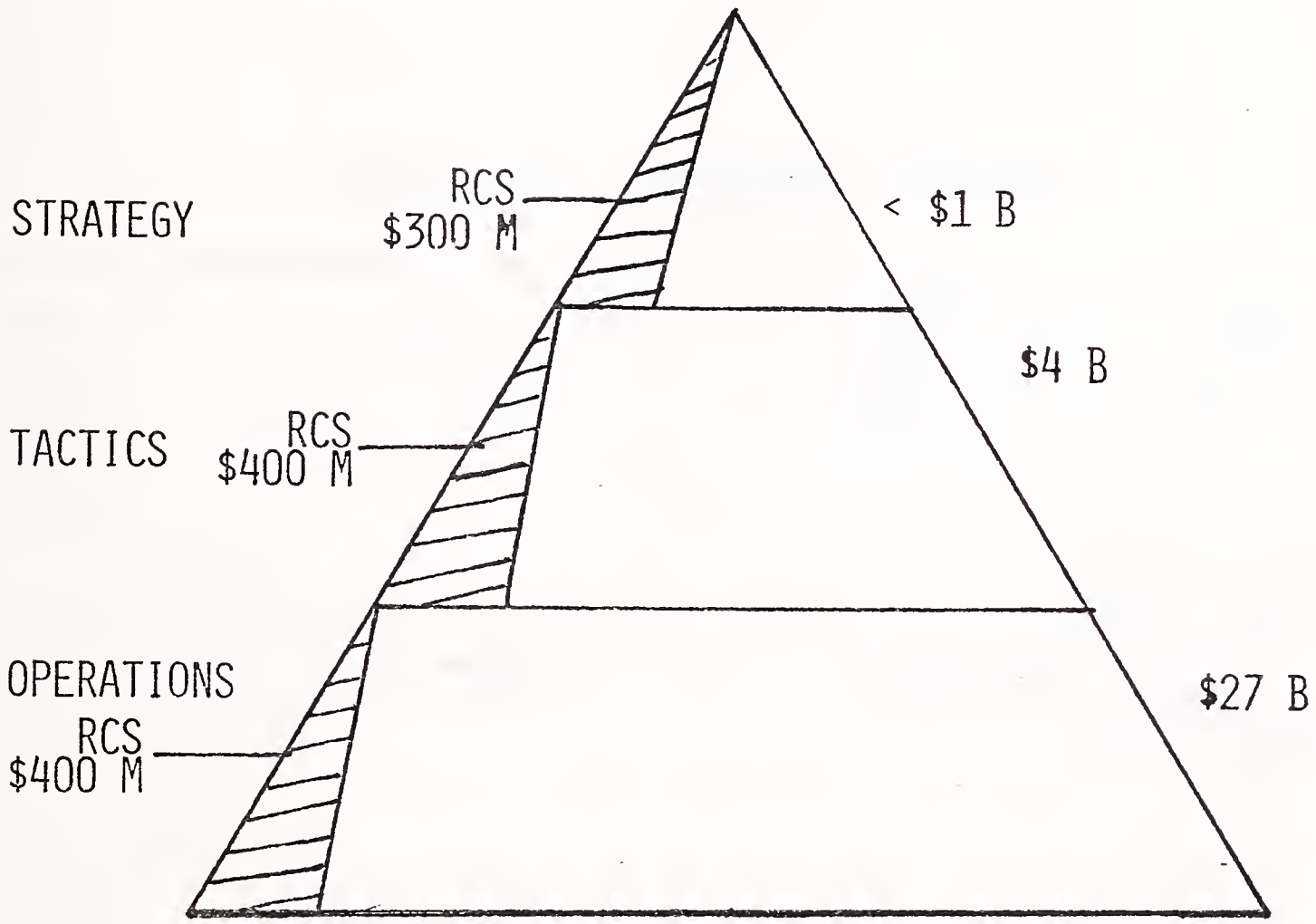
PROCESSING SERVICES

- CAPACITY SALES
- NETWORK-COMMUNICATIONS SERVICE
- GENERAL PURPOSE SERVICES TO
  - SCIENTIFIC
  - BUSINESS
- DATA BASES
- SPECIALIZED SERVICES



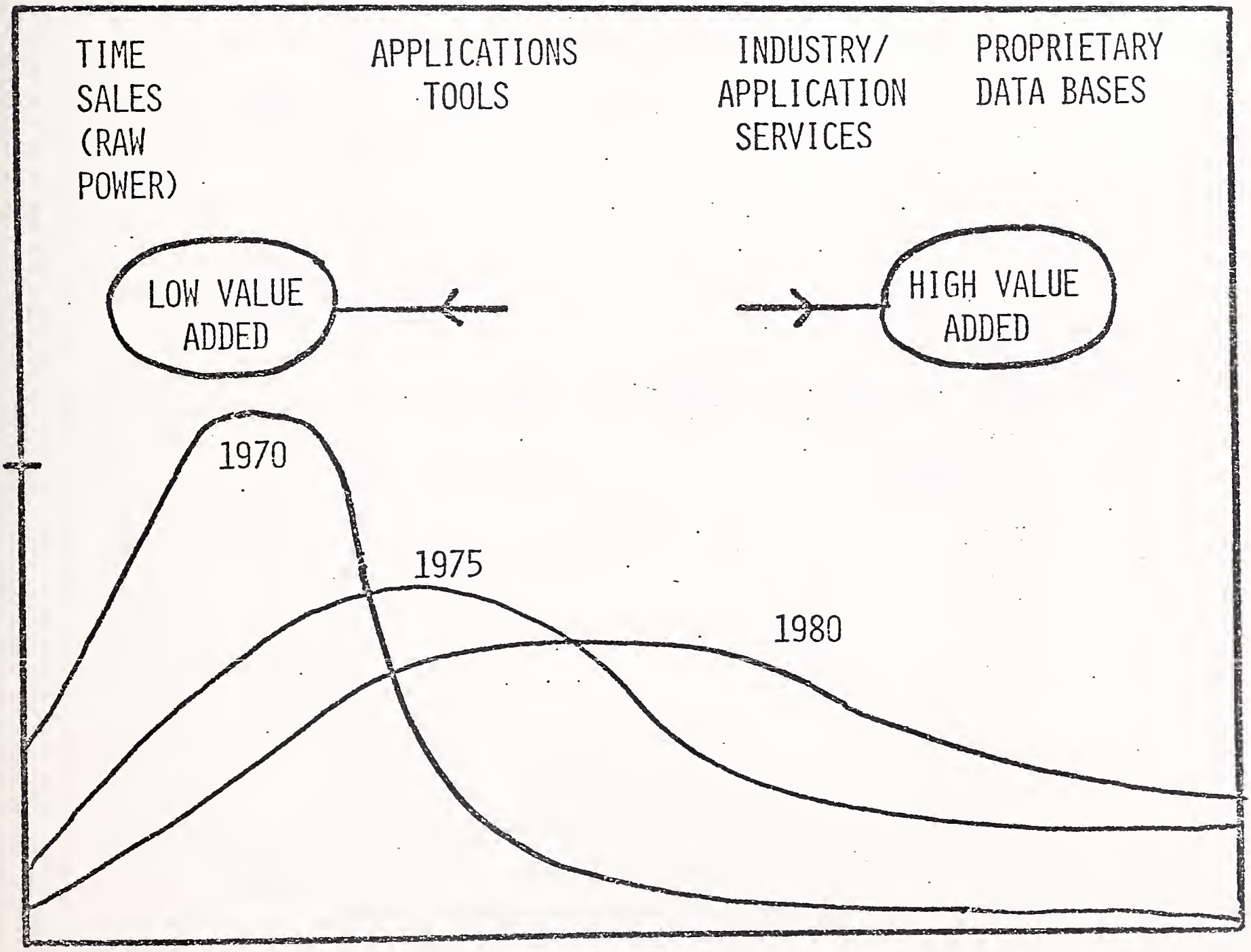
VALUE ADDED
(?)

REMOTE COMPUTING SERVICES (RCS) SHARE OF EDP EXPENDITURES

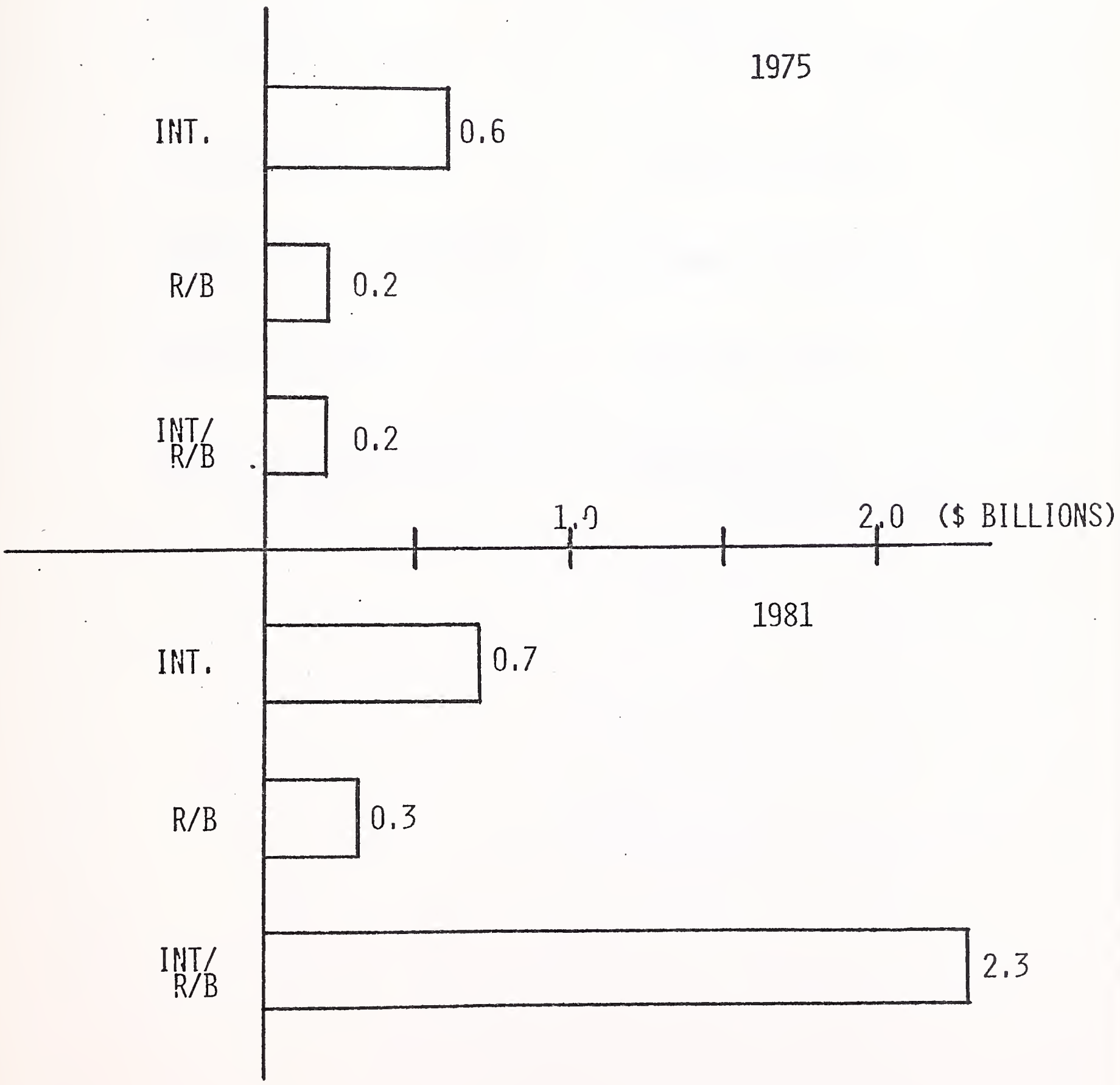


TOTAL 1975 MARKET $32 B

VALUE ADDED IN COMPUTER SERVICES

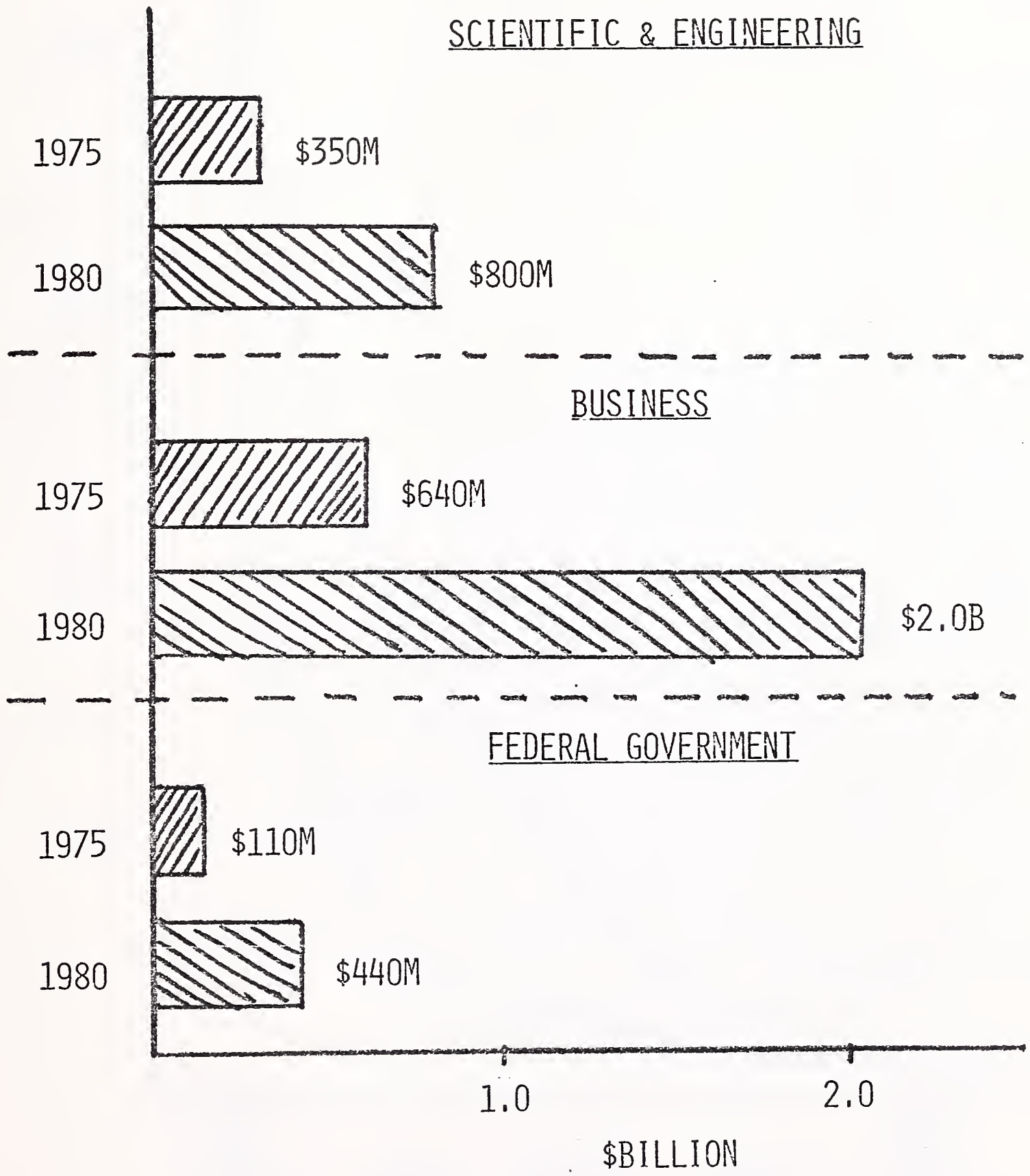


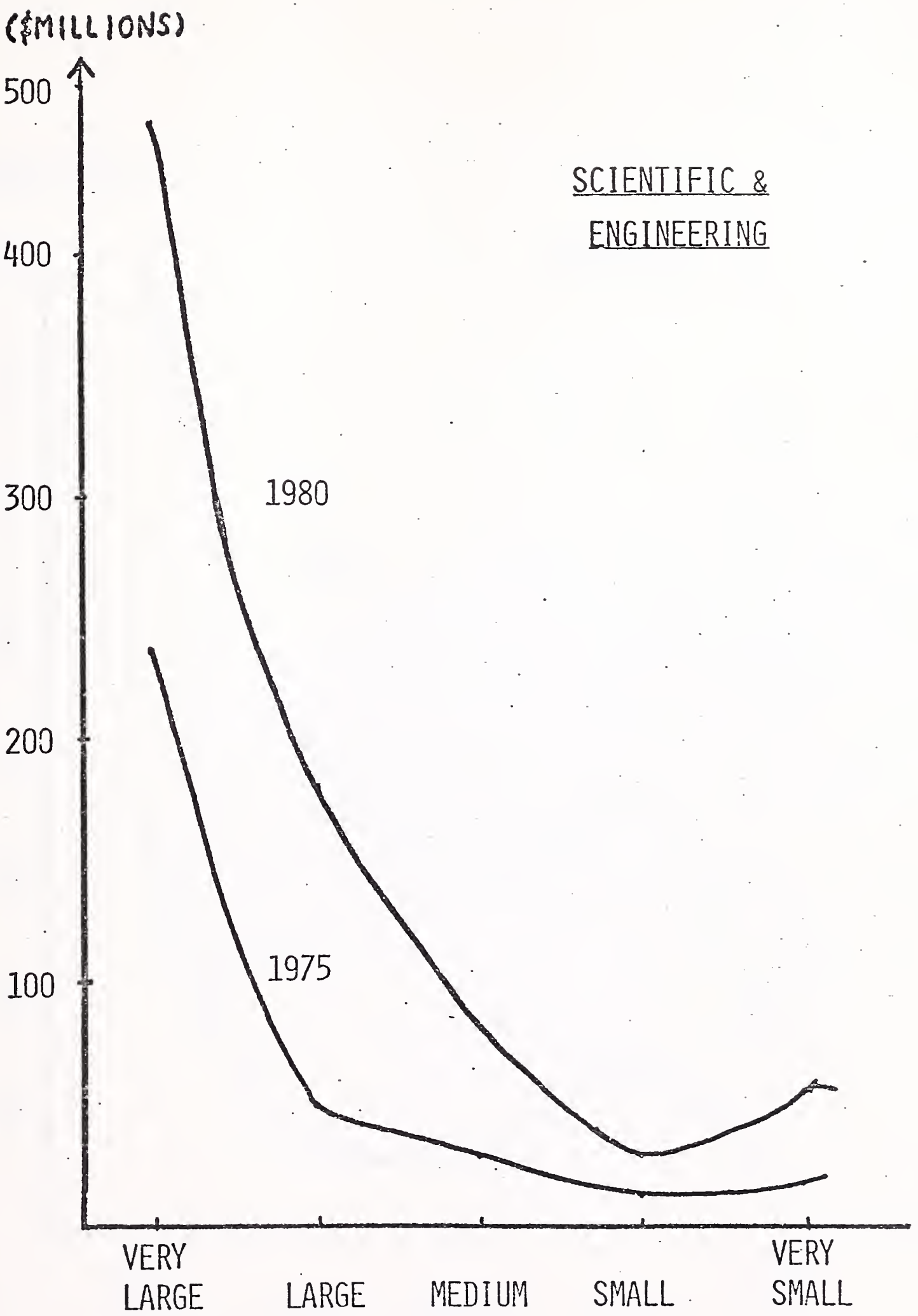
INTERACTIVE/REMOTE BATCH MARKET



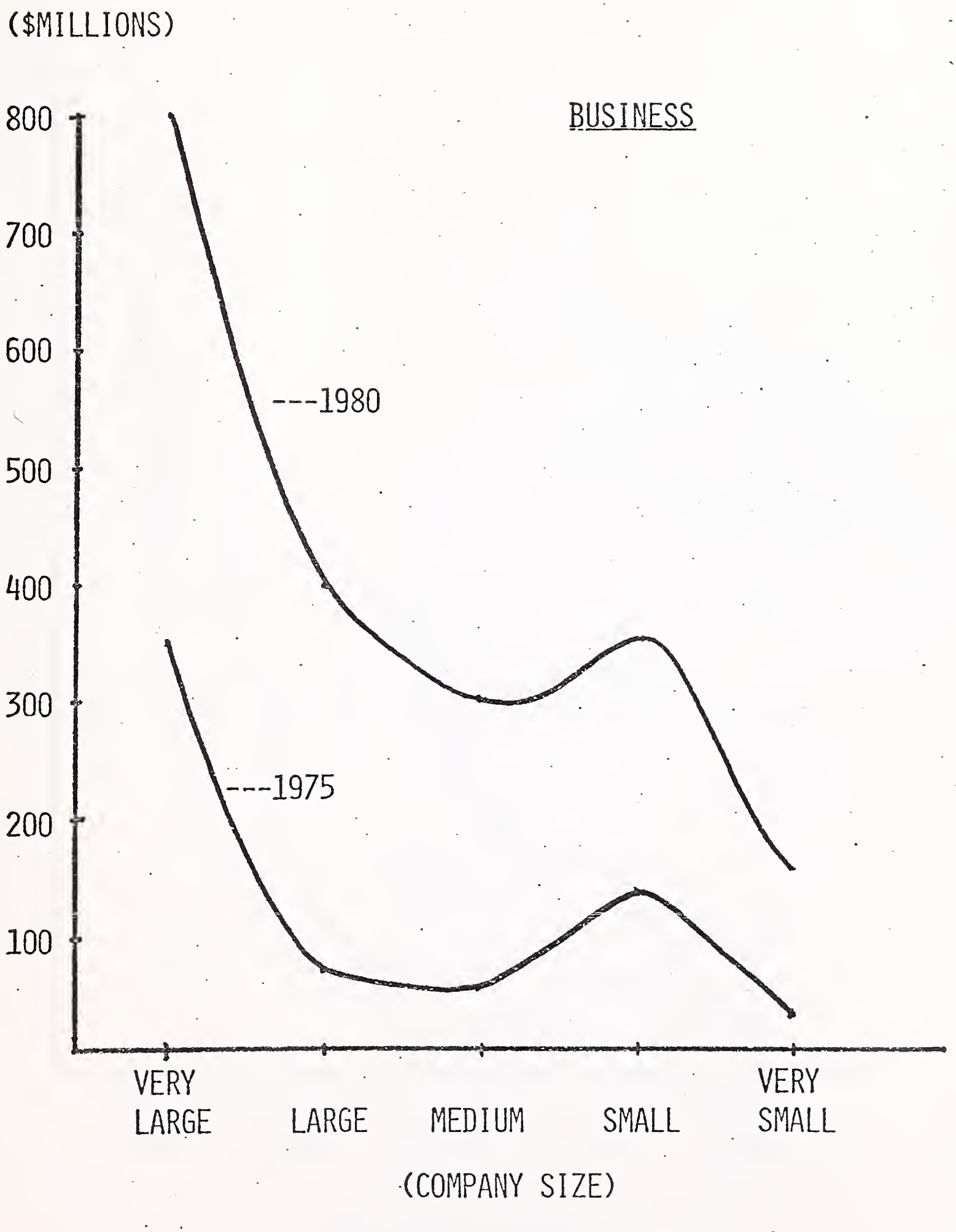
REMOTE BATCH	TIMESHARING
ACCOUNT SIZE: $5,000 P. MONTH	ACCOUNT SIZE: $1,000 P. MONTH
TRANSACTIONS	'PROBLEM SOLVING'
NETWORK NOT SO IMPORTANT	NETWORK IMPORTANT
LEAD TIME LONG	LEAD TIME SHORT
BACKUP & RELIABILITY CRITICAL	TURNAROUND AND FEATURES CRITICAL

REMOTE COMPUTING SERVICES MARKET -- BY TYPE OF USER

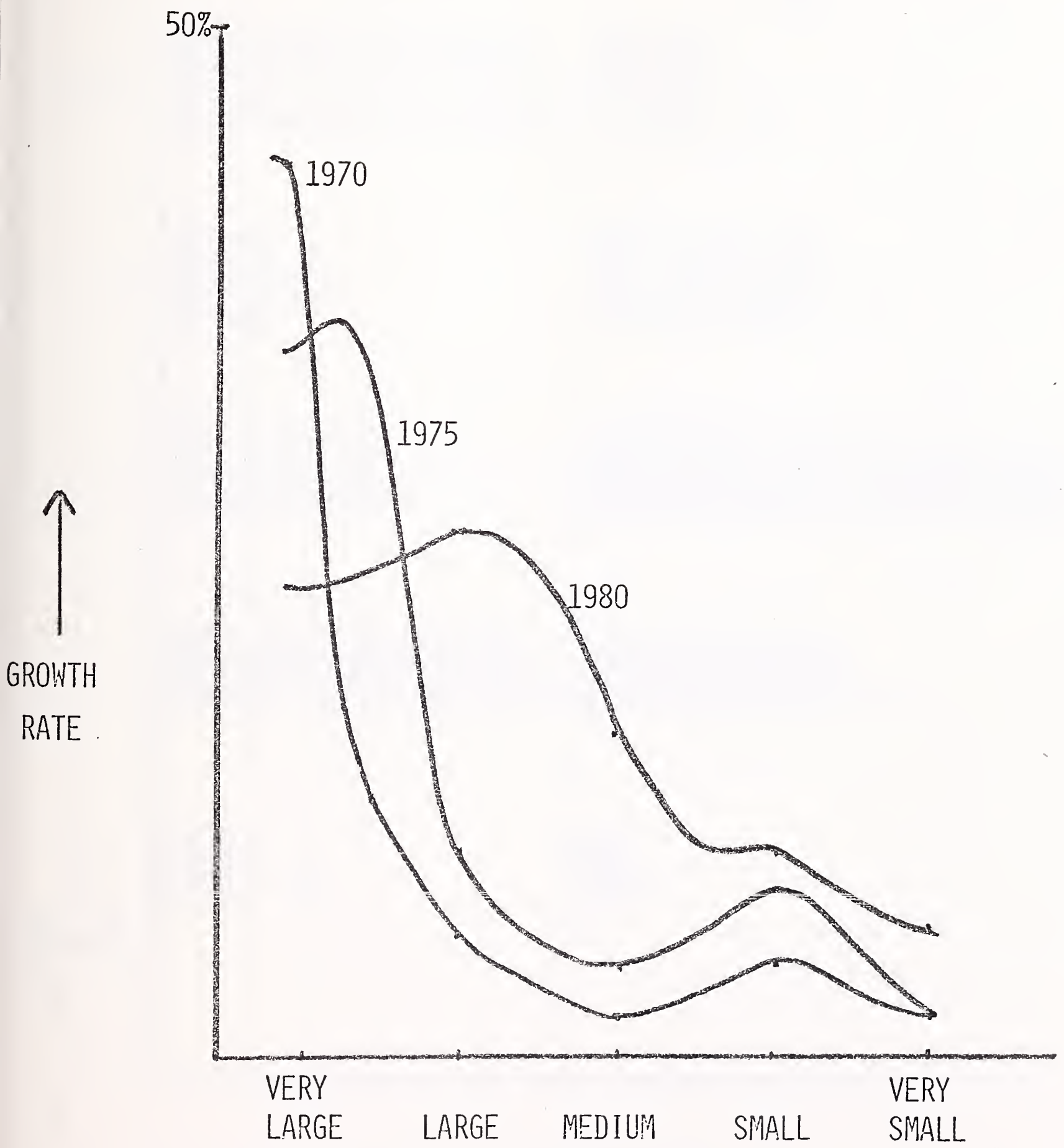




RCS MARKETS - BY SIZE OF USER

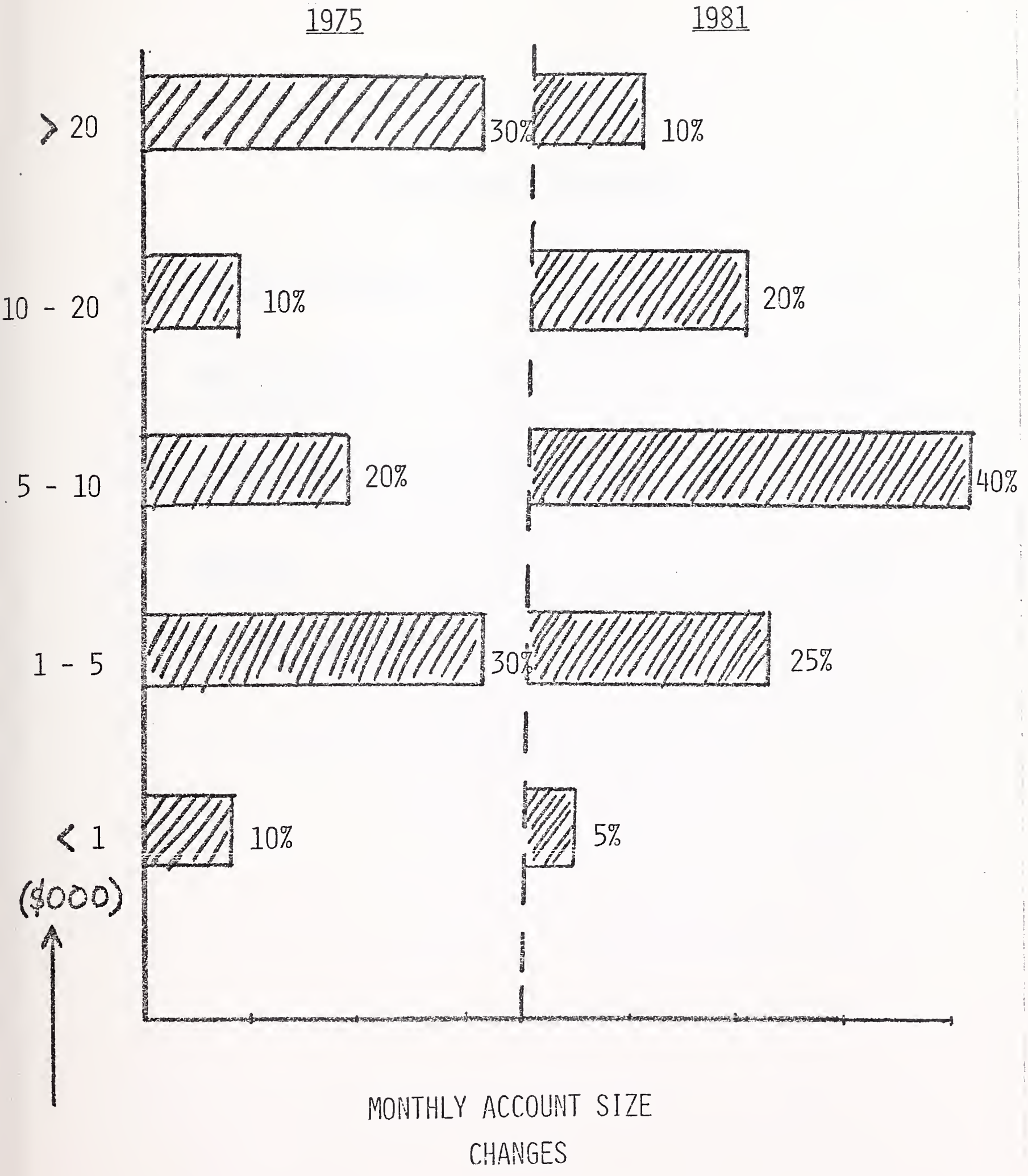


RCS MARKET - BY SIZE OF USER



RCS GROWTH RATES

SIZE OF USERS


1975
1981
> 20
30%
10%
10 - 20
10%
20%
5 - 10
20%
40%
1 - 5
30%
25%
< 1
($000)
10%
5%
MONTHLY ACCOUNT SIZE
CHANGES

HIGH GROWTH INDUSTRIES

• FEDERAL GOVERNMENT	35%
• MANUFACTURING	30%
• PROFESSIONAL/SERVICES COMPANIES	30%
• BANKING	25%

MANAGING PRODUCT CHANGE

- PRODUCT CONVERSIONS AND UPGRADES CAN
  - SEVERELY IMPACT REVENUE
  - OPEN DOORS TO COMPETITORS
- INDUSTRY SPECIALTIES AND MULTIPLE SERVICES REQUIRE CHANGES IN
  - MARKETING
  - ORGANIZATION
  - CUSTOMER SUPPORT
- VERTICAL INTEGRATION INTO HARDWARE FRAUGHT WITH DANGER
- ADD VALUE, E.G., SELL 'SERVICES' NOT 'COMPUTER UTILITY' IS MAJOR OPPORTUNITY

REMOTE BATCH MARKETPLACE

RECOMMENDATIONS FOR

UNIVERSITY COMPUTING COMPANY

JUNE 1975

MAIN RECOMMENDATIONS

- STAY ACTIVE IN THE SCIENTIFIC AND ENGINEERING MARKET
- DEVELOP A FULL INTERACTIVE CAPABILITY AND INTEGRATE IT WITH REMOTE BATCH
- DEVELOP AND IMPLEMENT A MINICOMPUTER FRONT-END TO DELIVER TO CLIENTS
- APPROACH BUSINESS MARKET FROM TOP END
  - -- MODELLING AND SIMULATION
  - -- DATA BASE HANDLING
- IMPLEMENT MASS STORAGE (FILE HANDLING) AND VOLUME INPUT/OUTPUT CAPABILITIES
- IMPLEMENT A MAINSTREAM IBM CAPABILITY

HARDWARE/SYSTEMS RECOMMENDATIONS

FOR SCIENTIFIC AND ENGINEERING MARKET

- DEVELOP A FULL INTERACTIVE CAPABILITY AND INTEGRATE WITH REMOTE BATCH
- DEVELOP A FULL GRAPHICS CAPABILITY AND SUPPORT IT IN INTERACTIVE MODE
- IMPLEMENT FRONT-END MINICOMPUTER SYSTEM FOR CLIENTS
- EMPHASIZE TURNAROUND AND RELIABILITY IN SYSTEMS TUNING
- ACTIVELY SUPPORT APL
- DEVELOP NEW APPLICATIONS SOFTWARE IN NEW TECHNOLOGY AREAS
- LOOK FOR 'TECHNICAL' DATA BASES

FOR BUSINESS MARKET

- IMPLEMENT NECESSARY HARDWARE/SOFTWARE TO HANDLE BUSINESS
  - -- FILE VOLUMES
  - -- TRANSACTION INPUT/OUTPUT VOLUMES
- INTEGRATE MAINSTREAM IBM HARDWARE/SOFTWARE CAPABILITY, INCLUDING COMMUNICATIONS
- CONSIDER IMPLEMENTING CICS/IMS
- ENSURE IBM FILES CAN BE HANDLED THROUGH INTERACTIVE AND REMOTE BATCH SYSTEMS
- DEVELOP INTERFACE WITH SYSTEM/32
- GET RANGE OF STANDARD APPLICATIONS SOFTWARE, FOR MINI/MAIN PROCESSING

PEOPLE RECOMMENDATIONS

- GET BUSINESS OPERATIONS RESEARCH GROUP
- SUPPORT THIS GROUP WITH PROFESSIONAL SERVICES CAPABILITY FOR APPLICATIONS DEVELOPMENT
- MARKET REMOTE BATCH AND INTERACTIVE SERVICES WITH SAME SALES FORCE
- SET UP SEPARATE SALES TEAMS FOR BUSINESS MARKET
- ENSURE BOTH SCIENCE AND ENGINEERING AND BUSINESS SALES FORCE TECHNICAL KNOWLEDGE IS SUPERIOR TO COMPETITION
- SET UP COMPUTER SUBSTITUTION SALES TEAM FOR LARGE ORGANIZATIONS

MARKET THRUST

- TARGET FEDERAL GOVERNMENT MARKET
  - -- SCIENTIFIC AND ENGINEERING AGENCIES
  - -- DATA BASE APPLICATIONS
- EXPAND ENGINEERING SERVICES MARKETS TO DO BUSINESS AS WELL AS CSC
- AGRESSIVELY COMPETE ON SERVICE AND PRICE
- TARGET BUSINESS ANALYTICAL MARKET ESPECIALLY WHERE THERE ARE APPLICATIONS REQUIRING
  - NETWORK
  - ON-LINE (INTERACTIVE) COMPONENT
  - HEAVY CPU DEMANDS
  - LARGE DATA BASES
  - MODELLING/SIMULATION FEATURES
  - HEAVY PRIME TIME USE

- GET INTERACTIVE CAPABILITY -- TARGET LARGE TIMESHARING CUSTOMERS

- TARGET LARGE AND VERY LARGE COMPANIES

- SELL AND OPERATE FULL INDUSTRY SPECIALIZED SERVICES SEPARATELY

- LOOK FOR SMALL/MEDIUM BUSINESSES REQUIRING SCIENCE AND ENGINEERING APPLICATIONS OR PROBLEM-SOLVING AS WELL AS BUSINESS PROCESSING

- FOR IBM-BASED MARKET TARGET ON McAUTO; COMPUTER ENHANCEMENT

- SELL DEDICATED FACILITY CONCEPT TO LARGE SCIENTIFIC/ RESEARCH ESTABLISHMENTS

    -- CDC/UNIVAC/IBM/DEC?

    -- INTERACTIVE/REMOTE BATCH

    -- RANGE OF APPLICATIONS SOFTWARE

OTHER CONSIDERATIONS

- SUPPORT 9.6 KB R/B AND PLAN FOR UP TO 50 KB
- HAVE DBMS COMPATIBLE ACROSS MINI/MAIN SYSTEMS
- SUPPORT POLLED REMOTE DATA ENTRY FROM LOCAL STORAGE
- BUSINESS USERS REQUIRE ACCESS TO HIGH VOLUME/QUALITY OUTPUT
- USE 'PUBLIC TERMINAL' MARKETING STRATEGY
- EMPHASIZE NETWORK CAPABILITY IN SUPPORT OF APPLICATIONS
- APPLICATIONS DEVELOPMENT SHOULD HAVE REMOTE/BATCH INTERACTIVE COMPONENTS DECIDED BY USER REQUIREMENTS, NOT VENDOR PREFERENCE

MARKET CHARACTERISTICS
GENERAL

- USERS WILL DEMAND INTEGRATED INTERACTIVE AND REMOTE BATCH
- USERS ARE GENERALLY BUYING A CAPABILITY NOT AVAILABLE IN-HOUSE
- SOURCES OF REMOTE BATCH REVENUES
  - -- MOSTLY FROM NEW APPLICATIONS
  - -- CONVERSION FROM IN-HOUSE BATCH ALSO COMMON
  - -- LITTLE EVIDENCE OF CONVERSION FROM T/S
- "SERVICE" IS CRITICAL
- NETWORKS, DB/FM SYSTEMS, AND PROPRIETARY SOFTWARE WILL GROW IN IMPORTANCE FROM SMALL BASE
- MASS STORAGE CAN OPEN NEW MARKETS

MARKET CHARACTERISTICS
BUSINESS APPLICATION PROCESSING

- FULL RANGE OF USER COMPANIES, INCLUDING LARGE COMPANIES WITH SUBSTANTIAL IN-HOUSE CAPABILITIES
- SPEND LESS THAN EITHER SCIENTIFIC OR COMPUTER SUBSTITUTION USERS
- NO DOMINANT VENDORS
- HARDWARE TYPE OF LEAST SIGNIFICANCE BUT IBM FILE COMPATIBILITY IMPORTANT
- APPLICATIONS ARE SPECIALIZED, OFTEN COMPLEMENTING IN-HOUSE CAPABILITIES
- CORE AND CPU REQUIREMENTS LARGER THAN AVERAGE
- NETWORKS, DATA BASES, AND PROPRIETARY SOFTWARE KEY IN THIS MARKET
- THREAT: IN-HOUSE CONVERSION

MARKET CHARACTERISTICS
COMPUTER SUBSTITUTION

- USERS HAVE SOME NEED FOR LARGE-SCALE PROCESSING BUT NOT ENOUGH TO JUSTIFY IN-HOUSE
- HIGH TECHNOLOGY AND/OR GROWING COMPANIES ARE BEST PROSPECTS
- $10 M - $100 M SALES VOLUME ($10 - 50 M ARE PRIME)
- COMPUTER SUBSTITUTION USERS SPEND MORE THAN APPLICATION USERS; REVENUE IS MORE SECURE
- IBM HARDWARE STRONGLY PREFERRED
- MINI'S WILL BE USED AS AN ADJUNCT TO REMOTE CAPABILITIES
- APPLICATIONS RUN FULL GAMUT OF COMMON BUSINESS PROCESSING
- THREAT: IN-HOUSE CONVERSION
- STRONG INDICATION VENDORS MUST HAVE INDUSTRY/APPLICATIONS EXPERTISE

MARKET CHARACTERISTICS
SCIENCE AND ENGINEERING

- MOST $ FROM LARGE COMPANIES
- 2/3 ARE HARDWARE DEPENDENT
- DOMINATED BY CDC
  UCC
  CSC
  McAUTO
- PRICE VERY IMPORTANT FACTOR

MARKET CHARACTERISTICS
SCIENCE AND ENGINEERING

- MOST ARE USER WRITTEN OR PUBLIC DOMAIN
- VERY LARGE CORE AND CPU REQUIREMENTS
- < 2 HOURS TURNAROUND FOR 2/3 OF JOBS
- STRUCTURES ANALYSIS
  NUCLEAR CODE
  MODELS
  SIMULATIONS

MARKET CHARACTERISTICS

FEDERAL GOVERNMENT

- CURRENT GSA/CSC CONTRACT IS ABOUT 20% OF TOTAL MARKET
  -- CSC AT $2 M/MONTH

- NEW CONTRACT WILL NOT GENERATE NEW REVENUES IN ITSELF

- VENDORS MUST MARKET TARGETTED AGENCIES HARD

- COST OF BUSINESS WILL INCREASE

APPLICATION SOFTWARE USED

- EXISTING USERS INCREASE THEIR USE OF VENDOR SUPPLIED APPLICATIONS SOFTWARE

- APPLICATIONS SOFTWARE ATTRACTS NEW USERS

- DB/FM SYSTEMS USED
  - -- 15% OF THE TIME NOW
  - -- 30% OF THE TIME 1978
  - -- 50% OF THE TIME 1980

  BUT BURIED MORE IN PRODUCTS

IN-HOUSE COMPETITION TO RCS

COMPETITION WITH IN-HOUSE SOLUTIONS

- BREAK UP OF EDP EMPIRES WILL BENEFIT SERVICES
- SHORT TERM, MOVE TO IN-HOUSE SLOWS SERVICE GROWTH
- COMPATIBLE SERVICES MORE EASILY MOVED IN-HOUSE
- IN-HOUSE SOLUTIONS OFTEN SELECTED ON EMOTION
- LACK OF FULL COSTING HURTS SERVICES
- SOFTWARE IS THE KEY

IN-HOUSE ALTERNATIVES

1. SMALL COMPUTERS ARE A THREAT AND AN OPPORTUNITY

2. LARGE INTERNAL SYSTEMS ARE HAVING MORE IMPACT

3. SOFTWARE DEVELOPMENT IS A BOTTLENECK IN MOST USERS' DATA PROCESSING

SUMMARY AND RECOMMENDATIONS

CHARACTERISTICS OF TIMESHARING CONVERSION

- ALL VERY LARGE ORGANIZATIONS WILL HAVE INTERNAL T/S

- REASONS FOR ESTABLISHMENT:
  - USER DEMAND
  - PROGRAM DEVELOPMENT
  - HARDWARE VENDOR ENCOURAGEMENT

CHARACTERISTICS OF TIMESHARING CONVERSION

- ESTABLISHMENT OF INTERNAL T/S
  - CUTS OFF NEW SERVICES BUSINESS
  - OPENS DOOR FOR CONVERSION
- OPPORTUNITY LOSS GREATER THAN ACTUAL LOSS
  - EXISTING APPLICATIONS USE DOUBLES
  - TOTAL USE TREBLES
  - LOSS WITHOUT CONVERSION

CHARACTERISTICS OF TIMESHARING CONVERSION

- EXTERNAL T/S WILL CONTINUE
  - DEMAND EXCEEDS INTERNAL CAPACITY
  - VENDORS HAVE SPECIAL CAPABILITIES
  - SOME END USERS WON'T CHANGE
  - CONVERSION NOT ALWAYS OBJECTIVE

- SPECIAL CAPABILITIES OF VENDORS
  - PROPRIETARY SOFTWARE
  - NETWORKS
  - DATA BASES
  - "R & D" IN SYSTEMS

CHARACTERISTICS OF IN-HOUSE TIMESHARING

- SEPARATE ORGANIZATIONAL VARIABLES FOR INTERNAL T/S:
  - 70% IS IBM-BASED
  - TWO-THIRDS IS INTEGRATED WITH OTHER DP
  - ONE-THIRD HAS DEDICATED SYSTEM

- DEDICATED IN-HOUSE SYSTEMS MOST SUCCESSFUL

- ALL T/S SYSTEMS UPGRADED SINCE INITIAL OPERATION

CHARACTERISTICS OF IN-HOUSE TIMESHARING

- GENERAL CHARACTERISTICS
  - RESPONSE TIME < 5 SECONDS
  - AVAILABILITY REPORTED OFTEN " 24 HOURS/7 DAYS"
  - RELIABILITY 98% TO 99%

- SUPPORT LESS THAN VENDORS PROVIDE
  - END USERS EXPECTED TO BE RESPONSIBLE
  - EDP PROVIDING T/S UTILITY

- TWO-THIRDS HAVE INTEGRATED T/S WITH NON-T/S APPLICATIONS

REASONS FOR CONVERSION

- EXTERNAL COSTS "TOO HIGH" AND INCREASING:
  - INTERNAL 50% OF EXTERNAL
  - "OUT-OF-POCKET" VS "HIDDEN"

- CONTROL AND SYSTEMS COMPATIBILITY ALSO STRONG REASONS

- EXPANDED FEATURES AVAILABLE INTERNALLY

COMPUTER MANUFACTURERS' ROLE

- IBM:
  - OPPOSES OTHER MANUFACTURERS FIRST
  - CONTROL OF COMMUNICATIONS-ORIENTED DP
  - DOESN'T YET HAVE THE PRODUCTS

- HONEYWELL:
  - IS A TIMESHARING VENDOR
  - SEES GENERAL NETWORK AVAILABILITY
  - "CRACK" IN IBM'S ARMOUR

- DEC:
  - AGGRESSIVELY AFTER INTERNAL T/S
  - "PLAYING BOTH ENDS AGAINST THE MIDDLE"

RCS (TIMESHARING) VENDORS

- SEE DEMAND GREATER THAN IN-HOUSE CAN HANDLE
- EMPAHSIZE "FULL" COSTING
- LACK EFFECTIVE MONITORING SYSTEMS
- DON'T WORK WITH EDP DEPARTMENTS
- NCSS EXCEPTION TO THE RULE:
  - WORKED WITH EDP MANAGERS
  - OBTAINED SEVERAL T/S FM CONTRACTS
- USER INVOLVEMENT TO THEIR ADVANTAGE

ECONOMICS OF SERVICES VS. IN-HOUSE

EXAMPLE: $ MULTI-BILLION CORPORATION

D.P. OPERATIONS ALTERNATIVES ($ MILLIONS)

1	2	3
STAND-ALONE	CENTRAL	OUTSIDE
	FACILITY	SERVICE
16.1	8.3	13.8
		(NO DISCOUNT)
		8.3
		(40% DISCOUNT)

IMPLICATIONS

- MEDIUM-SIZED INSTALLATIONS ARE REPLACEMENT TARGETS
- ECONOMIES OF SCALE APPLY MORE TO PEOPLE THAN EQUIPMENT/COMMUNICATIONS
- COMMUNICATIONS COSTS ARE DECREASING
- PEOPLE COSTS AND SCARCITY ARE INCREASING
- SERVICES CREATE NEW DP DOLLARS THAT CAN MIGRATE IN-HOUSE

FACTORS TO BE CONSIDERED

- TRUE COSTS ARE NOT JUST HARDWARE

- END USER LEVEL OF SERVICE AND SATISFACTION ARE KEY

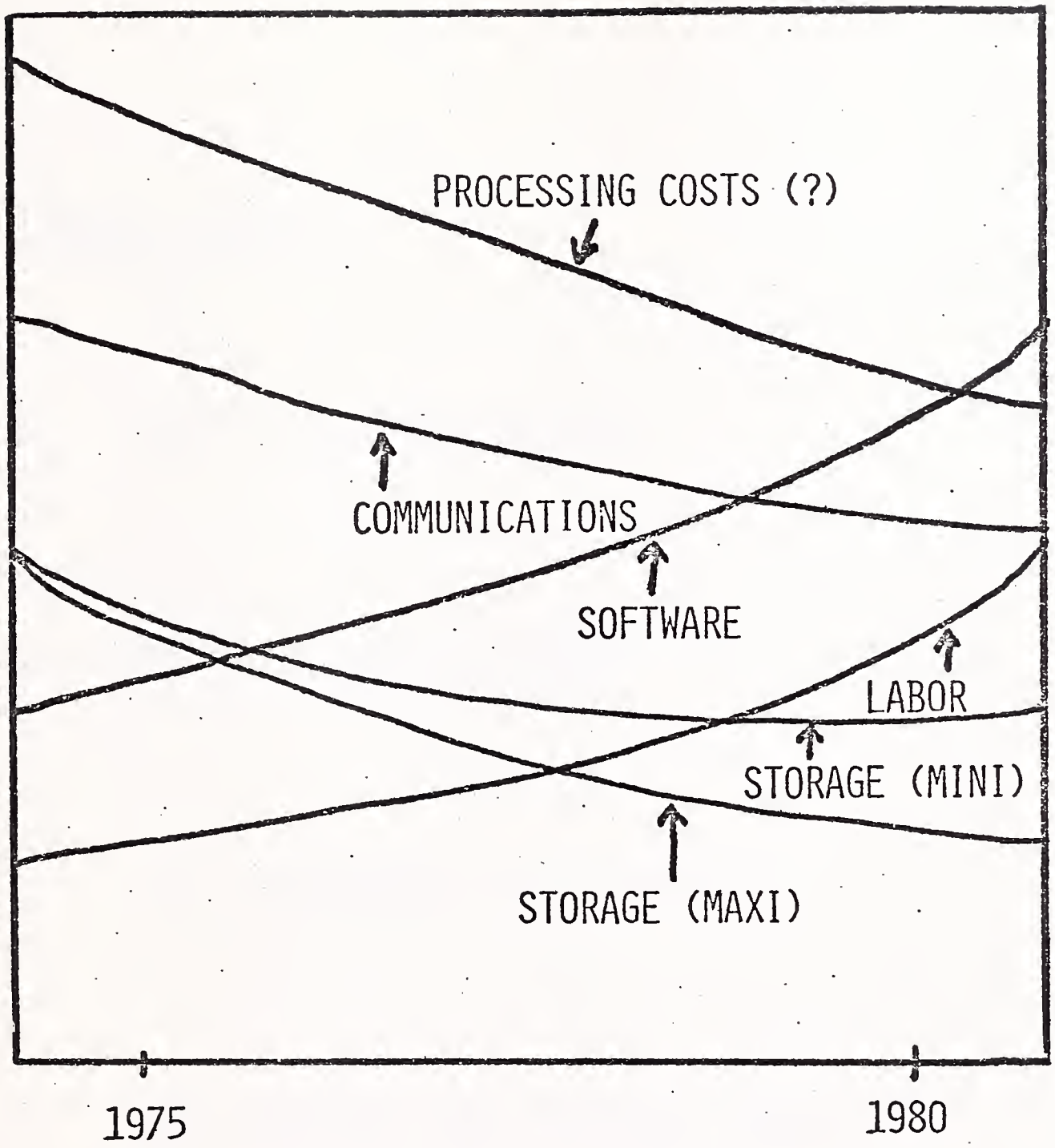
- RISK ANALYSIS REQUIRED
  - REDUNDANCY
  - SECURITY

- EXPANSION AND CHANGE SUPPORT

IMPACT OF MINI COMPUTERS

MINI/MICROCOMPUTERS - EMOTIONAL ISSUES INVOLVED

- INCREASING COMPETITION
  - -- SMALL BUSINESSES
  - -- TURNKEY APPLICATIONS
- DISTRIBUTED PROCESSING EXTENDS SERVICE CAPABILITIES
- MINI/MICROCOMPUTERS FOR VENDOR COMMUNICATIONS NETWORK
- ? LONG TERM COST CHANGES FAVOR LARGE SCALE SYSTEMS (?)
- ? HOW MUCH INTELLIGENCE AT END USER SITE?



USER INSTALLATION COST TRENDS
-- MINI VS MAXI

TURNKEY SYSTEMS

- MAJOR USE OF MINICOMPUTERS

- DECENTRAILZED PURCHASES

- LIKE TIMESHARING IN LATE '60s

- EDP DEPARTMENT MAY NEVER GET CONTROL

- VIABILITY OF SUPPLIERS AND SUPPORT ARE CONTINUING PROBLEMS

SUMMARY

- OF 11 FIRMS INTERVIEWED, 7 ARE NOW PROVIDING PROGRAMMABLE HARDWARE. TWO MORE ARE PLANNING TO PROVIDE PROGRAMMABLE HARDWARE. ALL NINE ARE PLANNING TO EXTEND THE CAPABILITIES OF THE PROGRAMMABLE HARDWARE THEY PROVIDE AND TO CONNECT THE TURNKEY MINIS TO THEIR NETWORKS.
- ALL AT EARLY STAGE OF MARKET TESTING.
- ALL EXPLORING OPTIMAL WAY TO APPROACH MARKET.
- INCREASED NUMBER OF PROGRAMMABLE DEVICES WILL BE AVAILABLE ON NETWORKS BY 1978,'79 TIMEFRAME AS PRICING AND MARKET STRATEGIES ARE WORKED OUT.
- SINGLE APPLICATIONS ROUTE MOST COMMON APPROACH.
- THE MAJORITY OF COMPUTER SERVICES VENDORS FEEL STRONGLY THAT OFFERING PROGRAMMABLE HARDWARE INCREASES OR HAS THE POTENTIAL OF INCREASING SERVICE REVENUES.
- 9 OUT OF 11 RESPONDENTS BELIEVE THAT OFFERING PROGRAMMABLE HARDWARE INCREASES CUSTOMER CONTROL.
- ACQUIRING SYSTEMS HOUSES SUPPLYING TURNKEY STANDALONE SYSTEMS WITH SPECIAL APPLICATION CAPABILITY TO BE INTEGRATED INTO NETWORK IS VIABLE EXPANISON STRATEGY.
- ACQUIRING APPLICATION ORIENTED SOFTWARE FOR MINIS IS ALSO A VIABLE GROWTH STRATEGY.

DO YOU PRESENTLY PROVIDE (OR PLAN TO) ON SITE CUSTOMER PROGRAMMABLE HARDWARE?

TOTAL NUMBER OF FIRMS INTERVIEWED	11

PROVIDING CURRENTLY:

ALL PROGRAMMABLE HARDWARE	7
OFFLINE PROGRAMMABLE MINICOMPUTERS	3
ONLINE PROGRAMMABLE MINICOMPUTERS	4
PROGRAMMABLE TERMINALS (ONLINE)	2

PLANNING TO PROVIDE:

ALL PROGRAMMABLE HARDWARE	9
OFFLINE PROGRAMMABLE MINICOMPUTERS	3
ONLINE PROGRAMMABLE MINICOMPUTERS	5
PROGRAMMABLE TERMINALS (ONLINE)	8

INDUSTRY ORIENTATION SUMMARY

INDUSTRY	# SERVING
● WHOLESALERS/DISTRIBUTORS	2
PETROLEUM DISTRIBUTORS	1
WINE & LIQUOR	1
ELECTRICAL SUPPLY	1
● NUMERICAL CONTROL/MANUFACTURING	2
AEROSPACE	1
GOVERNMENT (NAVY)	1
● MEDICAL/HOSPITALS/NURSING HOMES	2
● BANKING FINANCIAL ANALYSIS	2

- AVERAGE MONTHLY REVENUES
- SALE VS. LEASE POLICIES

COMPANY	AVERAGE MO REVENUE	SALE	LEASE
ADP/CYPHERNETICS	3-4K MONTH		36 MONTH FULL PAYMENT (EXPERIMENTAL)
BOEING			X
CSC			36 MONTH
GEIS		X	X
MC AUTO-HEALTH SERVICES	1.5-4K		PER TRANSACTION PER TERMINAL 36 MONTH
MC AUTO-NUM CONTROL	1.5-4K		36,60,80 MONTH
NCR			
NATIONAL CSS			X
TRW	$12K PER STORE PER MO	X	3-5 YEARS
TYMSHARE	1K TO 5K		1 YEAR MINIMUM
UCC	1K TO 5K	X	36 MO MINIMUM LEASE PURCHASE
UCS	800-25K	X	1 YEAR MINIMUM
TOTALS	NA	4	11

- MONTHLY REVENUES RANGE 800-25K-AVERAGE 3K.
- LEASE MOST COMMON METHODS.
- RANGE OF LEASES 1 YEAR TO 65+ YEARS - AVERAGE 3 YEARS.

- WHO MAINTAINS THE EQUIPMENT?
- WHO TRAINS THE USER?
- BUNDLE EQUIPMENT AND SERVICES.

COMPANY	MAINTENANCE	TRAINING	BUNDLING
ADP/CYPHERNETICS	MFG	WE	BUNDLE
BOEING	N/A	?	?
CSC	N/A	?	?
GEIS	N/A	?	?
MC AUTO-HEALTH SERVICES	MFG	WE	BUNDLE
MC AUTO-NUM CONTROL	MFG	WE	SERVICE/SEPARATE
NCR	MFG	WE	TURNKEY/BUNDLED
NATIONAL CSS	MFG	COMBINATION	?
TRW	WE	WE	BUNDLE
TYMSHARE	WE	WE	BUNDLE
UCC	MFG	WE	STANDARD BUNDLED SPECIAL SEPARATE
UCS	WE	WE	BUNDLE

- THE MANUFACTURER MAINTAINS 6 (INCLUDES TRW) OUT OF 8 PROGRAMMABLE EQUIPMENTS.
- THE SERVICE VENDOR IS PREPONDERANTLY RESPONSIBLE FOR TRAINING.
- BUNDLING EQUIPMENT'S SERVICES CHARGES IS THE MOST COMMON APPROACH USED.

- DO YOU THINK THAT OFFERING PROGRAMMABLE HARDWARE:
  - INCREASES OR DECREASES SERVICE REVENUE?
  - INCREASES OR DECREASES CUSTOMER CONTROL?

COMPANY	SERVICE REVENUE		CUSTOMER CONTROL	
	INCREASE	DECREASE	INCREASE	DECREASE
ADP/CYPHERNETICS	X		X	
BOEING	X		?	
CSC	X		X	
GEIS	X		NO DIFFERENCE	
MC AUTO-HEALTH SERVICES	DON'T KNOW		X	
MC AUTO-NUM CONTROL			X	
NCR				
NATIONAL CSS	X		X	
TRW	X		X	
TYMSHARE	TOO EARLY TO TELL		X	
UCC	DON'T KNOW		X	
UCS	X		X	

- 7 OUT OF 11 FEEL THAT SERVICE REVENUES ARE INCREASED.
- 9 OUT OF 11 FEEL CUSTOMER CONTROL IS INCREASED.

ADVANTAGES OF DISTRIBUTED DATA PROCESSING OVER NON-DISTRIBUTED

- BETTER CUSTOMER CONTROL.
- INCREASED PROFITABILITY (FOR VENDOR).
- CONNECT TIME AND STORAGE CHARGES OPTIMIZED.
- AVAILABILITY OF NETWORK FOR OTHER APPLICATIONS.
- SHARING OF SOFTWARE R & D AND MAINTENANCE COSTS WITH SUPPLIER OF MINI.
- ABILITY TO OFFER CUSTOMER TAILOR-MADE CHOICE BETWEEN STAND ALONE AND NETWORK SOLUTION.
- ABILITY TO ACCESS LARGER COMPUTER WHENEVER NEEDED.
- AVAILABILITY OF BETTER SUPPORT PEOPLE CENTRALLY LOCATED.
- USER CAN DECIDE ON SPLIT BETWEEN "IN-HOUSE" AND "OUT-HOUSE".
- ACCESS TO LARGE SOFTWARE SUPPORT LIBRARY.
- FASTER TURNAROUND ON BIG JOBS AND SEASONAL JOBS.
- ABILITY TO HOLD CUSTOMER'S HAND.
- HOLD DOWN HARDWARE COSTS.

- WHAT SYSTEM AND APPLICATIONS SOFTWARE DO YOU USE ON YOUR PROGRAMMABLE HARDWARE?

COMPANY	SYSTEM	APPLICATIONS
ADP/CYPHERNETICS	MODIFIED REALITY OWN SYSTEM (DEC)	AUTO DEALERSHIPS WHOLESALERS WINE & LIQUOR DIST. PLUMBING & ELECT DIST.
BOEING	MODIFIED DG DISK OS	TAX PACKAGE
CSC	MODIFIED CSC	VOICE RESPONSE-DATA MGMT-INVENTORY
GEIS	OWN O/S	NOT SELECTED
MC AUTO-HEALTH SERVICES	OWN SYSTEM	PATIENT ACCOUNTING-EKG FULL HOSPITAL ADMIN PACK 350 HOSP/50-900 BEDS
MC AUTO-NUM CONTROL	RDOS MRDOS	NUMERICAL CONTROL ENG & ARCHITECTURAL DESIGN
NCR		
NATIONAL CSS	NOT SURE	NOT SURE
TRW	OWN SYSTEM	-CREDIT) -POS)TIE TOGETHER -FINANCIAL)
TYMSHARE	TURNKEY	-MEDICAL HOSPITALS-BANKING -PATIENT CONTROL-PETROLEUM -FUEL ACCOUNTING
UCC	STANDARD DEC WITH MODS	NUMERICAL CONTROL EXPANDING TO COVER ALL MFG.
UCS	MODIFIED INTER DATA-DOS	

- ALL O/S ARE EITHER DEVELOPED OR MODIFIED BY THE COMPUTER SERVICE VENDORS.

- DESCRIBE THE PROGRAMMABLE HARDWARE YOU OFFER ON OR OFF THE SYSTEM.

COMPANIES	OFF LINE	ON LINE
ADP/CYPHERNETICS	MICRODATA* REALITY	PDP8 BASED PROGRAMMABLE SYSTEM
BOEING	DATA GENERAL NOVA	---
CSC		PROPOSING INTERDATA SYSTEM
GEIS		RPS 3
MC AUTO-HEALTH SERVICES		3700 PDP 11/35 CAPABILITY
MC AUTO-NUM CONTROL	ECLIPSE DATA DATA GENERAL-NOVA* GENERAL AUTOMATION DEC	NONE
NCR		
NATIONAL CSS	NO	NOT PLANNING PROGRAMMABLE TERMINALS
TRW	STORE CONTROLLERS* WITH POS	NONE
TYMSHARE		BURROUGHS 1700 DEC PDP11
UCC	DEC 11/34*	COPE SERIES OF TERMINALS
UCS	MOD COMP*	NONE

*PLANNING TO TIE INTO NETWORK

- NO PARTICULAR PREFERENCE FOR MINI MANUFACTURER.

- WHEN DO YOU EXPECT TO START DELIVERING PROGRAMMABLE HARDWARE?

COMPANIES	DELIVERING NOW	PLAN TO	NOT SURE	NEVER
ADP/CYPHERNETICS	X			
BOEING				X
CSC			X	
GEIS			X	
MC AUTO-HEALTH SERVICES	X			
MC AUTO-NUM CONTROL	X			
NCR				
NATIONAL CSS			X	
TRW		77-78		
TYMSHARE	X	77-78		
UCC	X	77-78		
UCS	X	77-78		

- WHAT COMMUNICATION AND SOFTWARE INTERFACE DO YOU PROVIDE TO TIE INTO YOUR NETWORK?

COMPANIES	ENCOURAGE	INTERACE
ADP/CYPHERNETICS	X	UNIVERSAL LOWSPEED EXTENDING TO H.S. ASCII BISINC
BOEING	X	WILL ACCEPT ALL CONVENTIONS
CSC	X	UNIVAC-IBM-OTHERS
GEIS	X	IBM & HONEYWELL PROTOCOLS
MC AUTO-HEALTH SERVICES	X	STANDARD SLOWSPEED INTERFACE + ASCII & BISINC + HIGHSPEED
MC AUTO-NUM CONTROL	X	(RS 232) WILL INTERFACE INTO NETWORK IN 6 MONTHS
NCR		
NATIONAL CSS	X	IBM 2780 BISINC ASCII
TRW		IBM PROTOCOLS
TYMSHARE	X	IBM, BURROUGHS, DEC CDC-(15 DIF COMP)
UCC	X	IBM HASP-UNIVAC-WE LIKE TO CHECK COMMERCIAL HANDLERS
UCS	X	HIGH SPEED INTERFACES CDC & IBM

- EVERYONE CLAIMS TO BE ABLE TO TIE INTO ALMOST EVERYTHING. THE ONLY WAY TO TEST IS TO TRY.
- UCC HAS THE COMMON SENSE APPROACH.

SUMMARY

OF

PROGRAMMABLE HARDWARE OFFERED BY

COMPUTER SERVICE VENDORS

COMPANY	ATTITUDE	SYSTEM
ADP/CYPHERNETICS	VP*	MICRODATA REALITY-PDP8 TERMINAL
BOEING	N	HAVE PROVIDED TAX PACKAGE ON MINI DATA GENERAL
CSC	E	INTERDATA
GEIS	E	RPS3 PROGRAMMABLE TERMINAL (CDC MANUFACTURER)
MC AUTO-HEALTH SERVICES	P	TERMINALS+PDP 11/35 (4) 28 ON ORDER
MC AUTO-NUM CONTROL GENERAL AUTOMATION	VP	MINIS-DATA GENERAL ECLIPSE/ DEC, GENERAL AUTOMATION
NCR		
NCSS	E	LIMITED CAPABILITY TERMINALS
TRW	E	APPL. ORIENTED TERMINALS
TYMSHARE	P	TERMINALS NOW MINIS LATER BURROUGHS 1700 PDP 11
UCC	P	COPE 7 DEC PDP 11/36
UCS	P	IN MKT-TEST MINI-MODCOMP

*VP - VERY POSITIVE - 2

P - POSITIVE - 4

E - EXPLORING - 4

N - NEGATIVE - 1

- WHY NO PLANS TO OFFER PROGRAMMABLE HARDWARE?
  - BOEING: MANAGEMENT AGAINST IT!!!
- DO YOU THINK COMPETITION WILL OFFER PROGRAMMABLE HARDWARE AND SERVICES?:
  - EVERYONE IS LOOKING AT IT!!!
- IF OTHERS OFFERED WOULD YOU FEEL FORCED TO DO SO?
  - NOT REALLY
  - NOT UNLESS WE FELT IMPACT
  - NOT APPLICABLE

SMALL BUSINESS COMPUTER MANUFACTURER PROFILE

- 30 MANUFACTURERS BUILDING SYSTEM AROUND PROPRIETARY CPU AND OFFERING:

  - FULL OPERATING SYSTEM $<$ \$50K.
  - INTERNAL MEMORY $\geq$ 32K BYTES.
  - DISK STORAGE $\geq$ 20M BYTES.
  - AT LEAST A 200 LPM PRINTER.
  - BASIC SYSTEM SOFTWARE.

- "CONTROL GROUP" OF 8 SELECTED FROM 12 INTERVIEWED.

SCOPE OF STUDY

- ANALYZE THE POSSIBLE TREND OF USERS SWITCHING FROM PROCESSING SERVICES TO SMALL BUSINESS COMPUTERS.

- IS THE PROCESSING SERVICES USER A TARGET OF OPPORTUNITY FOR THE SMALL BUSINESS COMPUTER MANUFACTURER?

- COMPETITIVE REACTION BY PROCESSING SERVICES VENDORS TO THE SMALL BUSINESS COMPUTER.

- JUSTIFICATION OF USERS FOR PURCHASING A SMALL BUSINESS COMPUTER.

- FUTURE TECHNOLOGICAL AND PRICING TRENDS IN THE SMALL BUSINESS COMPUTER MARKET AND THEIR EFFECT ON PROCESSING SERVICES.

SURVEY PROCEDURE

- USER PROFILE

  - 41 USERS INTERVIEWED.

  - REVENUES FROM $1 MILLION TO $30 MILLION (EXCEPT FOR ONE LARGE MANUFACTURER).

  - USERS SELECTED PRODUCTS OF 12 MANUFACTURERS.

  - 57% OF USERS EITHER IN MANUFACTURING OR DISTRIBUTION BUSINESS.

PROCESSING SERVICES VENDOR PROFILES

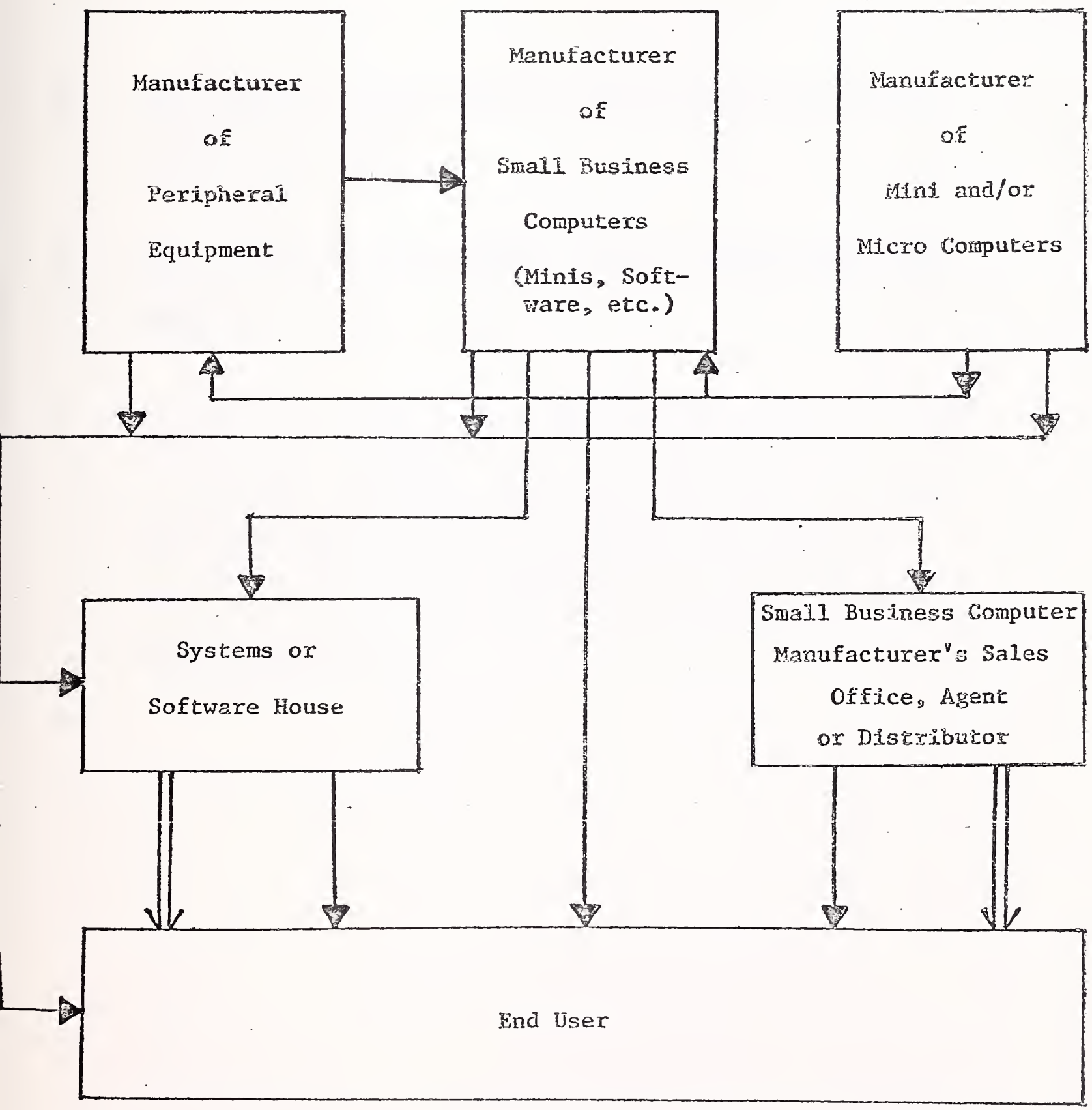
- 8 VENDORS RESPONDED TO THE SURVEY.

- REVENUES OF THE RESPONDENT PROCESSING SERVICES VENDORS RANGE FROM $2 MILLION TO $85 MILLION ANNUALLY.

- SERVICES OFFERED ARE EXCLUSIVELY BATCH, EXCLUSIVELY REMOTE COMPUTING OR A COMBINATION OF BOTH.

EXHIBIT V-1

DISTRIBUTION METHODS FOR SMALL BUSINESS COMPUTERS


Manufacturer of Peripheral Equipment
Manufacturer of Small Business Computers (Minis, Software, etc.)
Manufacturer of Mini and/or Micro Computers
Systems or Software House
Small Business Computer Manufacturer's Sales Office, Agent or Distributor
End User

Key:

———————— = OEM Sales

———————— = Turnkey Sales

COST COMPARISON

- MOST USERS DO NOT PERFORM DETAILED COST ANALYSIS PRIOR TO PURCHASE.

- MOST USERS DO NOT PERFORM A POST INSTALLATION COST AUDIT.

- DESPITE THE STATED USER INDICATION THAT COST IS ONE OF THE MOST IMPORTANT DECISION CRITERIA, THE FACT THE USERS DON'T MAKE AN IN DEPTH COST ANALYSIS INDICATES THAT OTHER ISSUES MAY BE CONSIDERABLY MORE IMPORTANT.

REASONS FOR USERS CHANGING FROM SERVICES TO SMALL BUSINESS SYSTEM

- "TURNAROUND TIME TOO LONG"
- "MORE BANG FOR THE BUCK"
- "TOO MUCH DOWN TIME"
- "EGO TRIP"
- "OUR 2 MAJOR COMPETITORS HAVE THIS SYSTEM"

EXHIBIT III-3

IMPORTANCE OF FACTORS IN CHANGING FROM A SERVICE

TO A

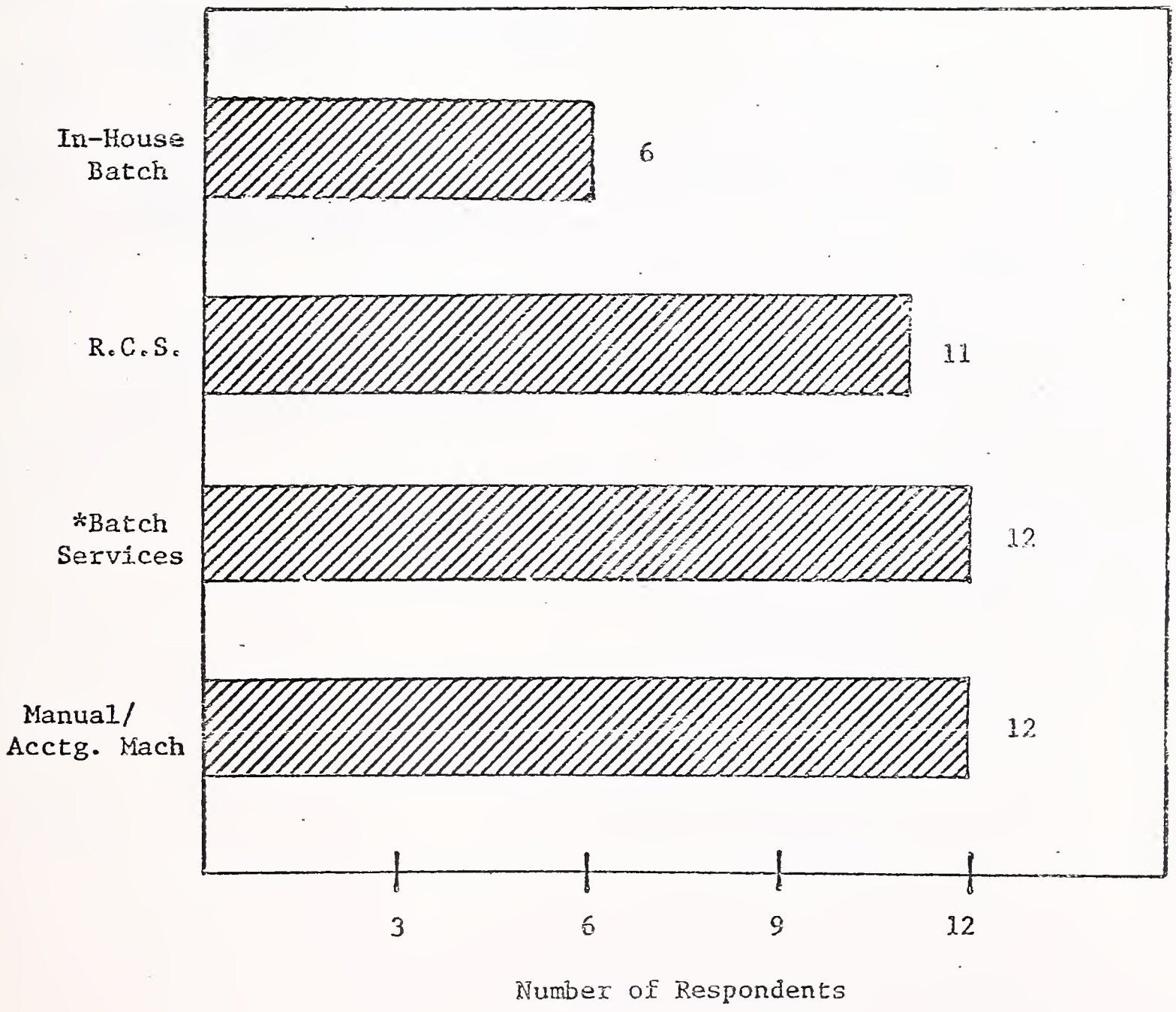
SMALL BUSINESS COMPUTER

Factors		Number of Users Ranking (1=unimportant; 10=critical)		
		1 - 3	4 - 7	8 - 10
1.	Reliability of system	0	2	14
2.	Applications programs available	10	3	3
3.	Network available	13	2	1
4.	Compiler available	5	3	8
5.	Assembler available	7	4	5
6.	Operating system available	3	7	6
7	Offering of turnkey	9	3	4
8.	Rental (30 days)	12	2	2
9.	Leases (1, 2, 3 years)	12	3	1
10.	Cost comparison	2	4	10

EXHIBIT I-3

DISTRIBUTION OF USERS' FORMER SYSTEM

FOR PROCESSING DATA



* 3 of the batch services users were manual except for payroll.

LOST BUSINESS ANALYSIS-
PROCESSING SERVICES VENDORS

- >50% OF LOST BUSINESS IS FROM CLIENTS SPENDING FROM $1500 TO $2500/MONTH.

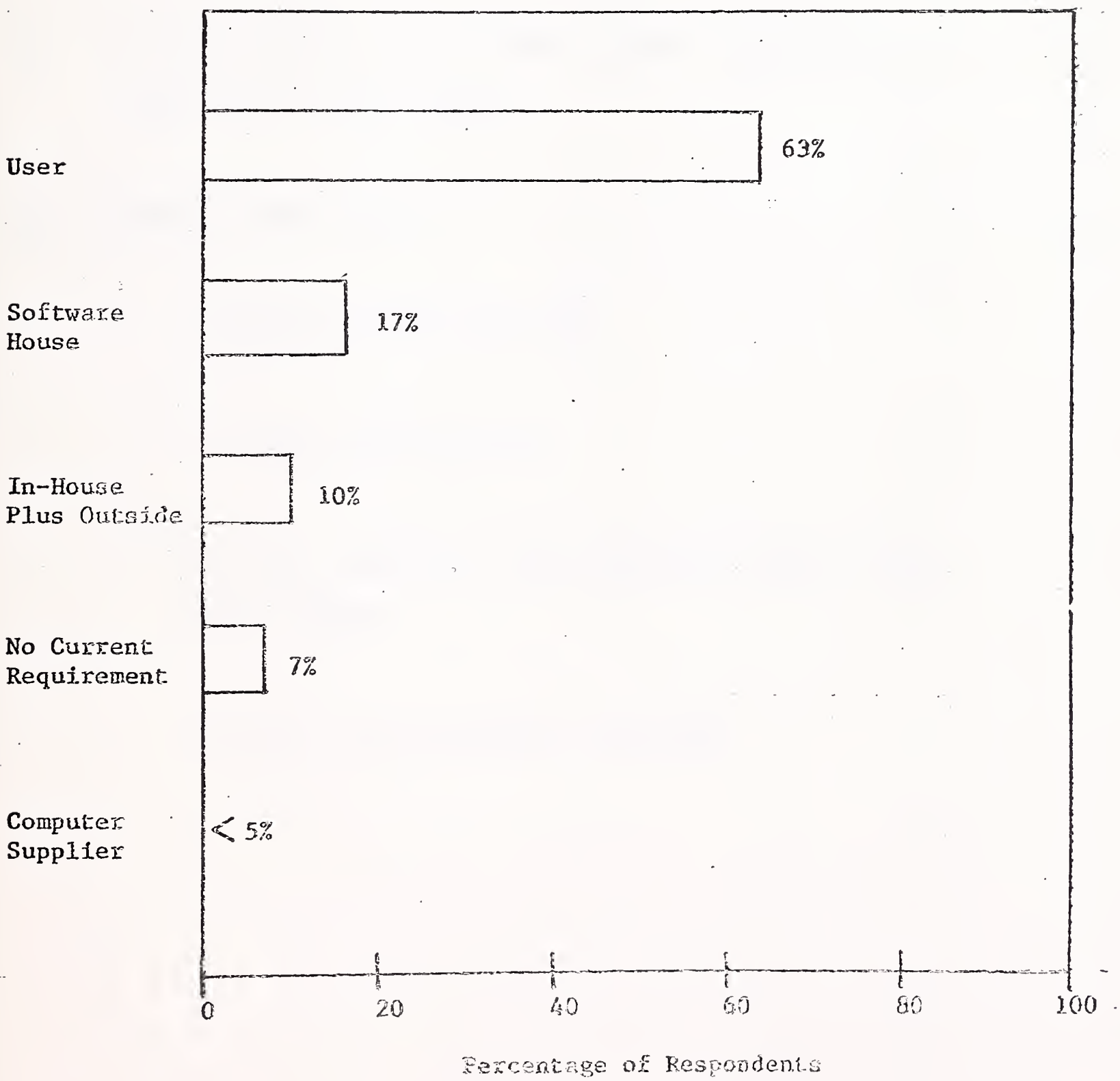
- VULNERABILITY WILL INCREASE AS PRICE OF SMALL BUSINESS COMPUTERS DROPS.

- A 30% COST ADVANTAGE, AS PERCEIVED BY THE USER, WILL GET HIS ATTENTION.

EXHIBIT III-5

WHO DOES APPLICATIONS PROGRAMMING

SUBSEQUENT TO INITIAL INSTALLATION?



IDENTIFYING POTENTIAL DEFECTORS

- FEW INDICATIONS OF A FORMAL EFFORT DESIGNED TO IDENTIFY AT EARLY STAGE.

- SOME OF THE SIGNS:

  - ACCOUNTING APPLICATIONS

  - A SINGLE APPLICATION

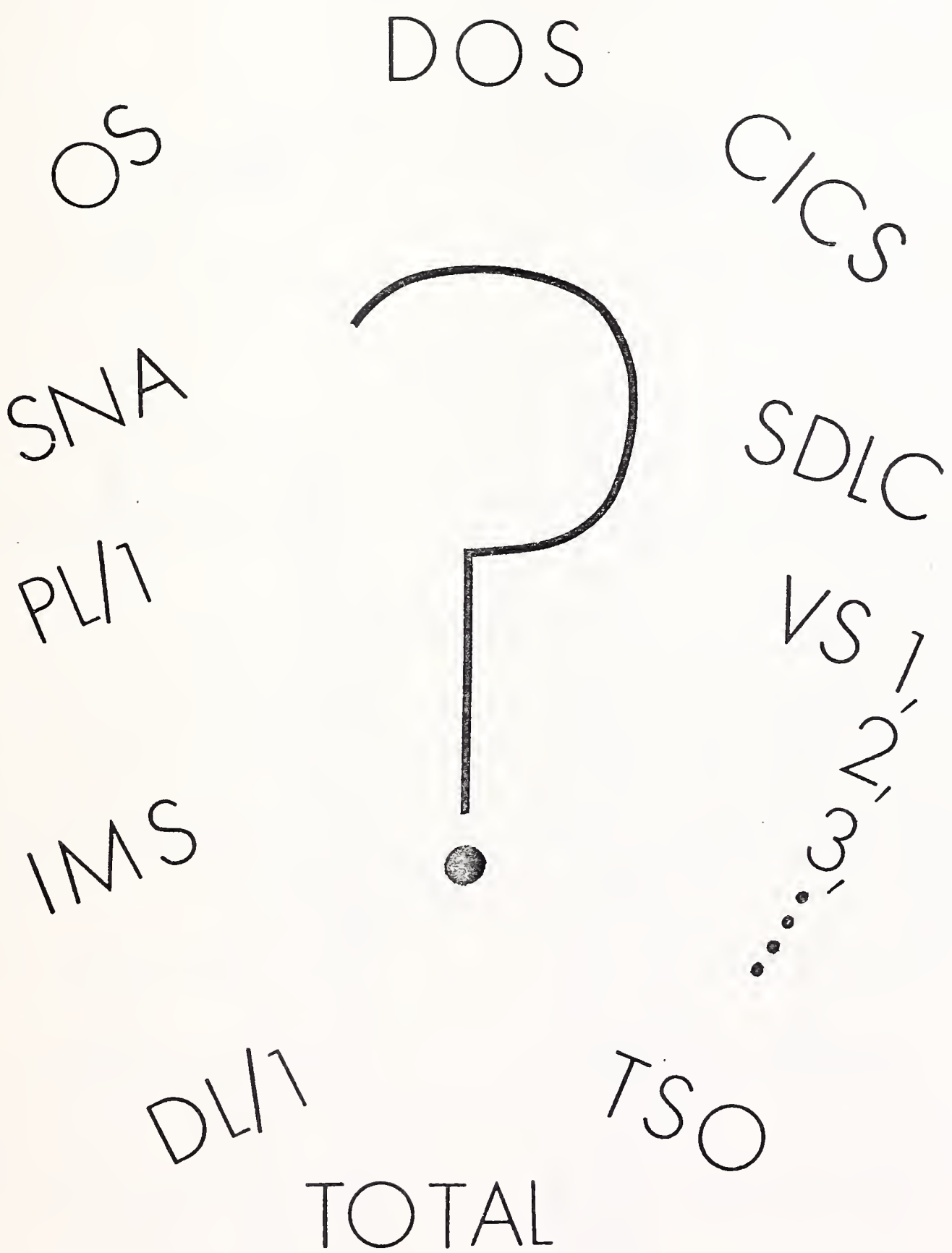
  - CLIENTS USING RCS THAT COULD BE DONE BY IN-HOUSE BATCH

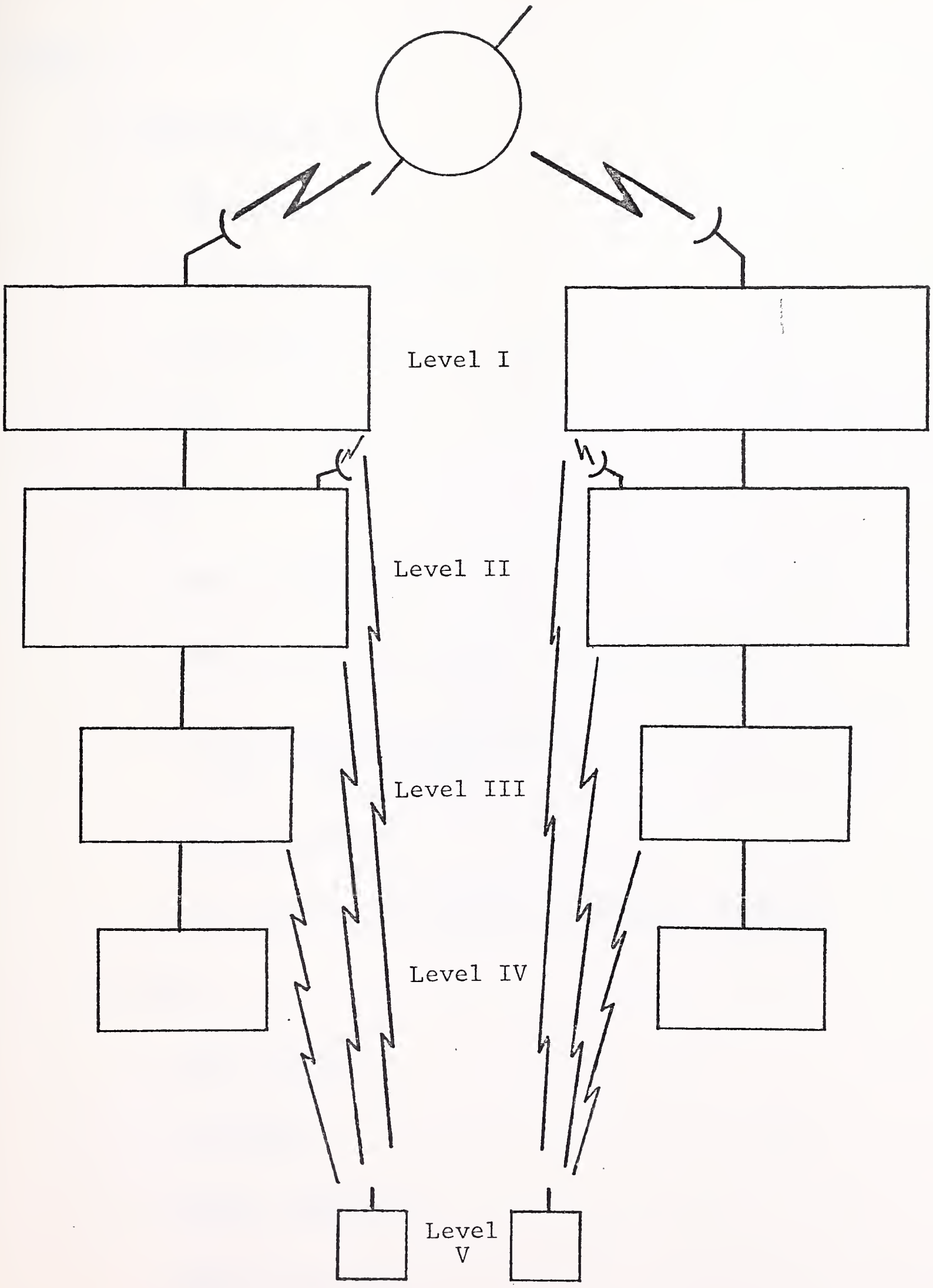
  - CLIENTS USING OUTDATED SOFTWARE

COMBATING THE THREAT

- PRICING FLEXIBILITY
- ADP
- REYNOLDS & REYNOLDS
- NCR
- "ONE STOP SHOPPING" & INDUSTRY SPECIALIZATION
- PLAN NOW -
  - COMMUNICATIONS NOT "THERE YET"
  - 1980: PRICE PERFORMANCE 1.6 X VS. 1976

CHANGING TECHNOLOGY


DOS
OS
CICS
SNA
SDLC
PL/1
VS 1
VS 2
3
IMS
DL/1
TSO
TOTAL


Level I
Level II
Level III
Level IV
Level V

LEVEL I

- CHARACTERISTICS
  - IBM 370/168 +
  - 5-10 YEARS - 10 X P/P
  - 10-20 YEARS - 20-30 X P/P
  - COST - $4 MILLION +
- USES
  - HEAVY COMPUTATION
  - TRANSACTION PROCESSING - LARGE DATA BASE
  - RJE REPLACEMENT OF MEDIUM & SMALL SCALE SYSTEMS
  - NETWORK CONTROL
  - DIRECTORIES, DICTIONARIES & ARCHIVAL STORAGE
- USERS
  - LARGE PRIVATE
  - GOVERNMENT
  - SERVICE COMPANIES
  - PUBLIC UTILITIES

LEVEL II

- CHARACTERISTICS
  - IBM 370/145 +
  - 5-10 YEARS - 6 X P/P
  - 10-20 YEARS - 12-18 X P/P
  - COST - $200K
- USES
  - NETWORK CONTROL
  - TIME SHARING
  - TRANSACTION PROCESSING - SMALL DATA BASE
  - DISTRIBUTED PROCESSING & DATA BASE
  - LOCAL DICTIONARIES & DIRECTORIES
- USERS
  - BUSINESS
  - GOVERNMENT
  - PUBLIC UTILITIES

LEVEL III

- CHARACTERISTICS
  - IBM 360/30 (INTERNAL)
  - 5-10 YEARS - 370/135-145 (INTERNAL)
  - 10-20 YEARS - 370/158 + (INTERNAL)
  - COST - $20K

- USES
  - DATA COLLECTION, EDITING & DISPLAY
  - NETWORK CONTROL (LOWER LEVELS)
  - TIME SHARING & OTHER LEVEL II FUNCTIONS

- USERS
  - INDIVIDUALS FOR "BUSINESS" AT WORK.
  - INDIVIDUALS FOR "BUSINESS & PERSONAL" USAGE AT WORK & AT HOME.

LEVEL IV

- CHARACTERISTICS
  - KEYBOARD TERMINALS
  - PRINTERS
  - CRT'S
  - SENSORS
  - CARD-READERS, ETC.
  - AWAY FROM HARD COPY
  - GREAT VARIETY OF SPECIAL PURPOSE

- USES
  - DATA ENTRY (CAPTURE)
  - DISPLAY

- USERS
  - INDIVIDUALS AT WORK & LIMITED USAGE AT HOME
  - INDIVIDUALS FOR "BUSINESS & PERSONAL" USAGE AT WORK & AT HOME

IBM

- EMPHASIS ON CAPACITY - GREAT NUMBER OF THINGS FAIRLY QUICKLY

- MICROCODE BASED SYSTEMS
  - SOFTWARE 'ENGINES'
  - INDUSTRY SPECIALTY

- REDONE SOFTWARE
  - IDEALLY PROGRAMS/DATA INDISTINGUISHABLE
  - VIRTUAL = REAL

- TECHNOLOGY LESS IMPORTANT
  - SOFTWARE RESPONDED IN THE PAST
  - SOFTWARE LEADS FOR THE FUTURE

IBM

- 158 AND 168 REPLACEMENTS (1978)
  - FUNTIONAL PROCESSORS
  - LANGUAGE PROCESSORS

- LANGUAGES
  - PL/1 ON-LINE BUSINESS LANGUAGE
  - APL

- SECURITY: HARDWARE CODES

- MICROCODE SYSTEMS SOFTWARE

HONEYWELL

- EMPHASIZING DISTRIBUTED PROCESSING
- ADVANCED DBMS
- MULTIPLICITY OF HARDWARE
- SOFTWARE WILL PROVIDE NEXT PRICE/PERFORMANCE BREAK

CDC

- INTRODUCING 370/148 AND 370/158 COMPATIBLE SYSTEM
- MAIN PROCESSORS SCIENTIFIC IN AIM
- DATA BASE PROCESSORS DEPENDENT ON DBMS STABILITY
- BELIEVES IBM WILL COME OUT WITH FUNCTIONAL PROCESSOR BASED SYSTEM
- EMPHASIZING DBMS/DC SOFTWARE IN R & D

BURROUGHS

- MOST SOFPHISTICATED OPERATING SYSTEMS
- SOME COMPATIBILITY WITH IBM
- MAY PUT EMULATION PROCESSOR IN NEW ARCHITECTURE
- LOOKING AT SUPER COMPUTERS
- 'MORE' SCIENTIFIC CAPABILITY THAN UNIVAC LESS THAN CDC
- MAINTENANCE LOUSY

SPERRY UNIVAC

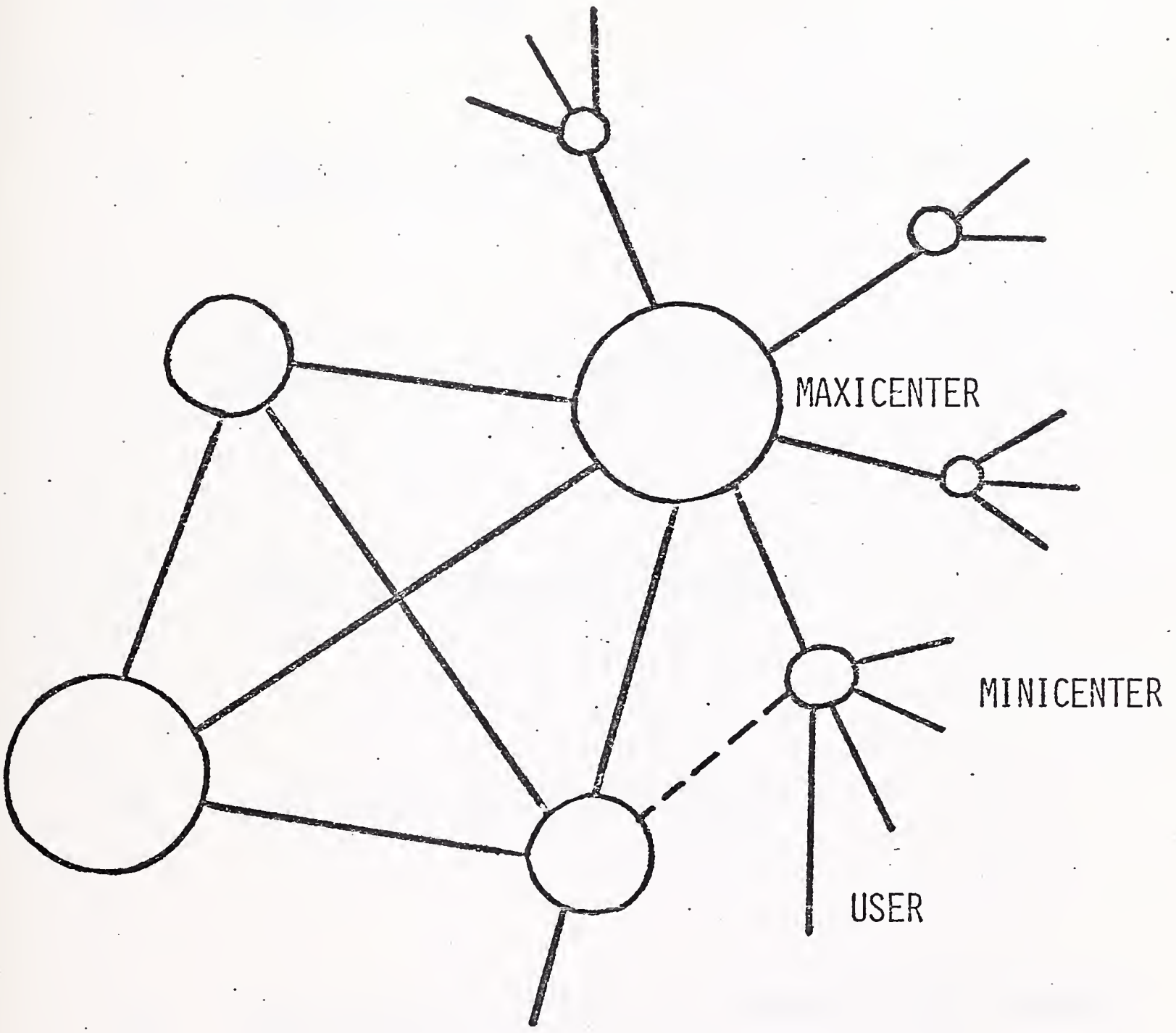
- INCOMPATIBILITY WITH IBM AT HIGH END
- LARGE COMPUTERS MORE EFFICIENT THAN MINIS IN MEMORY USE
- GO 'HEAD TO HEAD' WITH IBM RELY ON 30% PRICE/PERFORMANCE MARGIN
- UPGRADES WILL PROVIDE GROWTH

SPERRY UNIVAC

- 50% OF REVENUES FROM 1100 LINE
- MULTI-PROCESSING CAPABILITY
- 1100 MORE 'COMMERCIAL' THAN 'SCIENTIFIC'
- 'EASE OF USER INTERFACE' A CONCERN
- IMPROVEMENTS FORESEEN
  - ELECTRONICS PACKAGING
  - BUBBLE MEMORY (1977)
  - JOSEPHSON JUNCTION (1985)
  - DASD STORAGE

DECENTRALIZATION VS CENTRALIZATION

- NETWORKS SUPPORT DISTRIBUTED PROCESSING
- LOCATION OF CENTERS MOVING OUT FROM MAJOR CITIES
- DISTRIBUTED/DECENTRALIZED PROCESSING ≡ DECENTRALIZED DECISION MAKING
- EVENTUALLY HAVE MULTIPLE PROCESSING CENTERS WITH DISTRIBUTED PROCESSING NET



FUTURE NETWORK CONFIGURATION

NEED FOR DATA NETWORKS

- ECONOMICS IN CONSOLIDATING DISPERSED DATA CENTERS
- MAKE MULTIPLE CENTERS POSSIBLE
- BRING IN INTERNATIONAL BUSINESS
- MAKE OR BUY DECISION CRITICAL
- NEW BUSINESS POTENTIAL IN COMMUNICATIONS NETWORKS
- WILL 'DATA ONLY' NETWORKS SURVIVE?

COMMUNICATIONS

- INTEGRATION OF COMMUNICATIONS
- FILE TRANSFER
- SERVICES INTO HOME/OFFICE
- EDUCATION/TRAINING/RECREATION

INFORMATION PROCESSING

- DATA PROCESSING + WORD PROCESSING = INFORMATION PROCESSING

- EXTENSION OF COMPUTER USE INTO MANAGEMENT/OFFICE
  - — DATA ENTRY
  - — OUTPUT HANDLING

- GENERAL TREND FOR IBM

- 'ENGLISH' TEXT EDITOR

- LOCAL 'DATA BASE' MANIPULATOR

INTELLIGENCE LOCATION

- DISTRIBUTED/DISPERSED PROCESSING NOT HERE YET

- LOCAL INTELLIGENCE FOR COMMUNICATIONS AND TERMINAL CONTROL GENERALLY ACCEPTED

- ECONOMIC JUSTIFICATION STILL TO BE RESOLVED

- COMMUNICATIONS COST AND SOFTWARE AVAILABILITY MAIN FACTORS

DISTRIBUTED COMPUTING

- WILL INCREASE THE INFORMATION SERVICES MARKET OVERALL
- WILL PEAK IN 2-3 YEARS
- WILL BE A GREATER THREAT TO MORE GENERALIZED SERVICES

THEREFORE

- MOST VENDORS MOVING TOWARD INCREASED SPECIALIZATION
- TERMINALS WILL BECOME MORE INTELLIGENT, OR REPLACED BY MICRO/MINI COMPUTERS
- GOAL IS TO HAVE A TERMINAL ON EVERY USER'S DESK

FUTURE TRENDS

- ALL TERMINALS WILL BE INTELLIGENT
- COMMUNICATIONS SPEEDS WILL INCREASE TO 9600B
- BELL SYSTEM'S PROPOSAL FOR MESSAGE UNIT TIME CHANGES COULD ADD $100 PER MONTH TO USER'S PHONE BILL
- TERMINAL PRICES WILL COME DOWN
  - CRT'S DOWN 30% IN 5 YEARS
  - RB DOWN 56% IN 5 YEARS

FUTURE TRENDS, CONT'D

- PROLIFERATION AND SHAKE-OUT OF TERMINAL VENDORS
  - PRICE CUTTING
  - CONSOLIDATIONS
- WORD PROCESSING WILL BE INTEGRATED WITH DATA PROCESSING
- IBM WILL RE-ENTER SERVICES BUSINESS
  - NETWORKING MINI-COMPUTERS
    - TO EACH OTHER
    - TO LARGE MAINFRAME

BUSINESS COMMENTS

- DISTRIBUTED PROCESSING WILL BE HELPFUL

- IBM WILL REMAIN THE LEADER
  - PRICE UMBRELLA WILL REMAIN

- MICRO/MINI COMPUTERS WILL BE USED IN/AS TERMINALS

- NO MAJOR TECHNOLOGICAL BREAKTHROUGH EXPECTED

- SERVICES VENDORS URGED NOT TO MANUFACTURE

IMPORTANCE OF TECHNOLOGICAL FEATURES

- I/O SPEEDS
- FLEXIBILITY FOR UNPLANNED APPLICATIONS
- DEGREE OF INTELLIGENCE
- OTHERS

MOST IMPORTANT TERMINAL SELECTION CRITERIA

- RELIABILITY/MAINTENANCE
- PRICE
- SOFTWARE AVAILABLE
- REFERENCES FROM OTHER USERS

SELECTION CRITERIA FOR SERVICES VENDORS

- COST/PERFORMANCE
- SUPPORT
- SPECIALIZED SOFTWARE (USUALLY PACKAGES)

FORECAST TRENDS

- INCREASED LOCAL INTELLIGENCE
- DISTRIBUTED PROCESSING
- HIGHER LINE SPEEDS
- PORTABILITY OF TERMINALS
- GRAPHICS AND PLOTTING CAPABILITY

COMMENTS ON SERVICES

SALESPEOPLE VS. TERMINAL SALESPEOPLE

- SMARTER
- MORE CONCERNED WITH USER
- MORE KNOWLEDGEABLE ABOUT USER'S BUSINESS
- MORE CAPABLE OF HELPING USER SOLVE PROBLEMS
- LESS PUSHY

IBM DB/DC DEVELOPMENT 1971-1975

- DL/1 KEY IN IBM'S DATA BASE STRATEGY
- SNA KEY IN IBM'S DATA COMMUNICATIONS STRATEGY
- CICS, IMS, AND GIS THREE MAIN DB/DC PRODUCTS
- IBM REAFFIRMED STRATEGY IN 1975

IBM DB/DC PROBLEM AREAS

- COMPLEXITY
  - ADDRESSED BY IPOS
- PERFORMANCE
  - ALSO ADDRESSED BY IPOS
- CODE QUALITY
  - SINGLE GREATEST PROBLEM

CURRENT IBM DB/DC ENVIRONMENT

- MEMORY SIZE INCREASING
- INTEGRATION OF VM/370 IN MODELS 138 AND 148
- VM/370 KEY APPLICATIONS DEVELOPMENT AID
- MAJOR DB/DC UPGRADES
  - MULTIPLE SYSTEM COUPLING IN IMS
  - IMS/VS FAST PATH
  - DL/1 INTERFACE EXPANSION
  - DATA DICTIONARY FOR IMS/VS AND DOS/VS DL/1

FUTURE IBM ACTIVITIES

- DB/DC PRODUCT UPGRADES
  - INCLUDING IN-FLIGHT DL/1 DATA BASE MAINTENANCE
  - SNA INTERFACES
  - EXPANSION IMS/VS MSC
  - EXPANSION IMS/VS FAST PATH
- SECURITY
  - DL/1 SECURITY EXPANDED TO CICS/VS
  - FIELD SECURITY UNDER CICS
  - SYSTEM DICTIONARY - HANDLES ALL REQUESTS FOR DATA
- DISTRIBUTED DATA BASES
  - IMS/VS MSC WITH VTAM
  - USE OF NCP/VS DIRECTLY
  - SIMILARITY FOR CICS
  - SYSTEM/3 - SYSTEM/32 COMMUNICATING, NOT SHARING WITH SYSTEM 370
  - SNA IS THE SHIELD
  - SERIAL INTERFACE PROBABLE

IBM FUTURE PALTUS

- RELATIONAL DATA BASE VS DL/1 EXPANSION

- DL/1 AS IMPORTANT NOW AS OPERATING SYSTEMS WERE IN THE 60's

- RELATIONAL DATA BASE REQUIRES LOT MORE WORK

- OTHER CHARACTERISTICS

  - MASSIVE DATA BASE CAPABILITY (PROBABLY 31 OR 32 BIT ADDRESSING)
  - CICS & IMS TO MERGE INTO ONE
  - ENGLISH LANGUAGE QUERY LANGUAGE
  - EASIER APPLICATION DEVELOPMENT
  - MUCH OF FUTURE DBMS IN HARDWARE - REMAINDER WILL BE IN OPERATING SYSTEM
  - (NOTE VM ASSIST FEATURE ON 138/148)
  - 'SYSTEM DICTIONARY'WILL BE DATA LANGUAGE OF THE DBMS
  - SECURITY
  - TIMESHARING ACCESS FEATURE

- USER MIGRATION POTENTIAL IS KEY

DBMS-BASED SERVICES
(DBMSS)

- CURRENTLY $70 MILLION PERYEAR
  (FOR 17 MAJOR VENDORS)

- END USERS ARE DP TRAINED

- REVENUE PER MONTH IN THREE GROUPS:

  LOWEST RANGE $0.1K - $10K - AVERAGE $1.1K
  MEDIUM RANGE $1.5K - $30K - MEDIUM $3.3K
  HIGHEST RANGE $7.K - $300K - HIGHEST $83.2

- USERS OF THIRD PARTY (E.G./IMS) GENERALLY USE LESS THEN PROPRIETARY

- PROPRIETARY DBMSS USED FOR ANALYSIS

- THIRD PARTY USED FOR PRODUCTION

- >80% OF USERS CONSIDER DBMSS APPLICATIONS VERY IMPORTANT OR CRITICAL

- STAFF FUNCTIONS MORE IMPORTANT THAN OPERATIONS

USER RANKINGS OF CRITERIA FOR
DBMSS SELECTION
(1 = HIGH, 6 = LOW)

	PROPRIETARY	THIRD PARTY	GROUP
VENDOR SERVICE RELIABILITY/AVAILABILITY	1.5	2.0	A
DBMS FEATURE	3.1	2.0	B
VENDOR TECHNICAL SUPPORT	2.5	3.0	B
VENDOR PRICE	3.4	4.6	C
PORTABILITY TO IN-HOME	5.7	4.0	C
VENDOR EXPERIENCE IN CUSTOMER APPLICATIONS AREA	4.7	5.4	C

REASONS FOR USE OF DBMSS

- CUSTOM APPLICATIONS DEVELOPED FASTER
- INQUIRY, REPORTING AND UPDATING DONE BY NON-DP PEOPLE
- EASY ANALYSIS OF A LOT OF DATA
- DBMSS BRINGS 'STATE-OF-THE-ART' TO USER

REQUIREMENTS AND CONSIDERATIONS

- SUBSTANTIAL TRAINING IN VENDOR'S ORGANIZATION
- EXPERIENCED PEOPLE HARD TO FIND
- OPERATIONAL COMPLEXITIES ARE INCREASED
- COMPETITIVE BUSINESS
- SIGNIFICANT FRONT-END INVESTMENT
- CONFUSION AMONG USERS AND VENDORS ON WHEN AND WHY A DBMSS SHOULD BE USED

ANALYSIS OF SED OPPORTUNITIES

INPUT

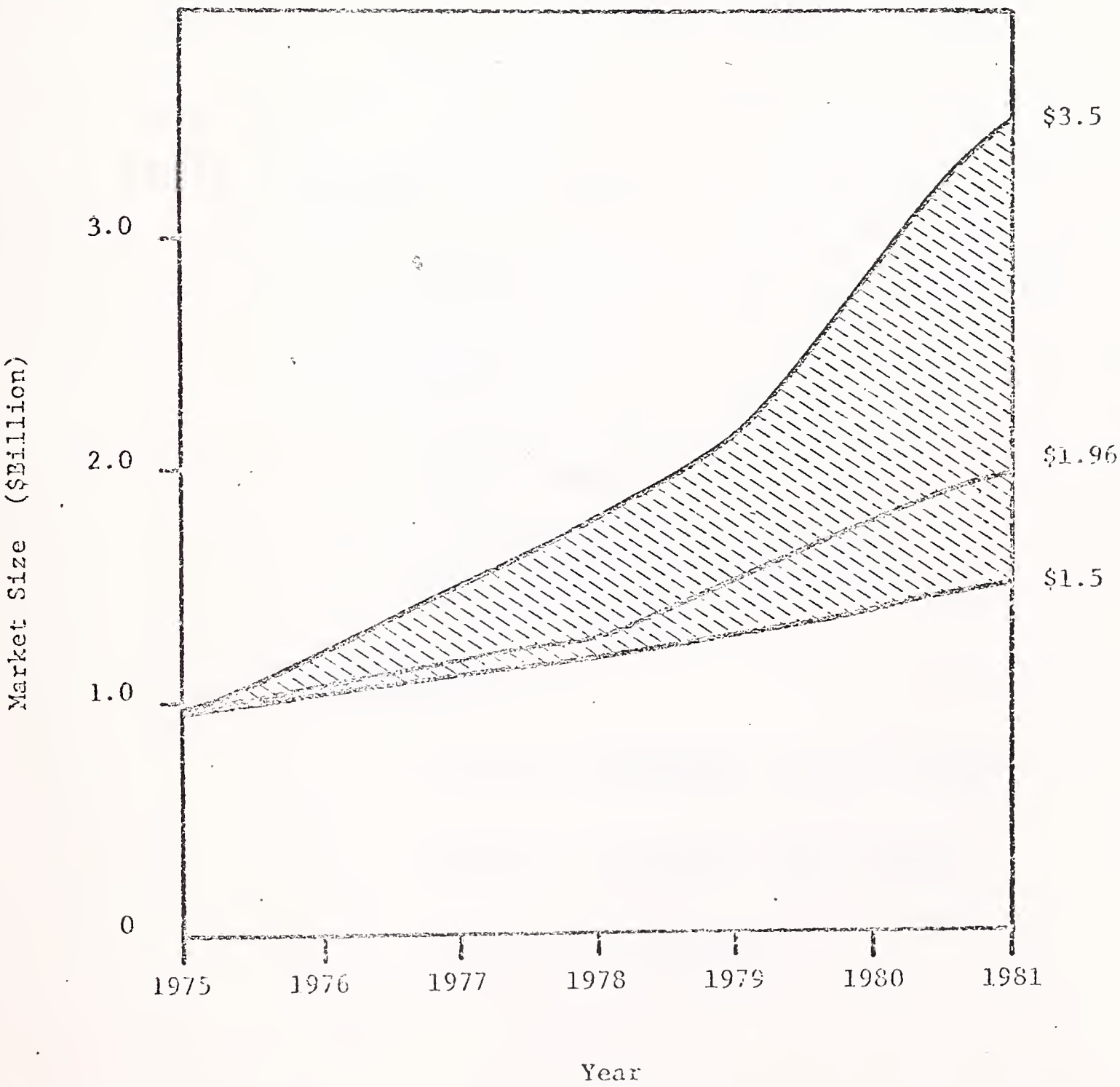
HARDWARE/SOFTWARE FUNCTIONAL PROCESSORS

- PERFORMANCE EVAULATION/SCHEDULING IN EDP SHOPS
- COMMUNICATIONS NETWORK - (VOICE, DATA, AND OTHER)
- POST PROCESSING - WORD PROCESSOR SYSTEMS
- SET UP AND MAINTAIN DIAGNOSTIC NETWORK FOR MINI AND TERMINAL SUPPLIERS
- WRITE SOFTWARE PACKAGES FOR MINI COMPANIES

  E.G. SNA SIMULATORS
  INTERFACES

EXHIBIT V-43

Potential Professional Services Market Growth 1975-1981



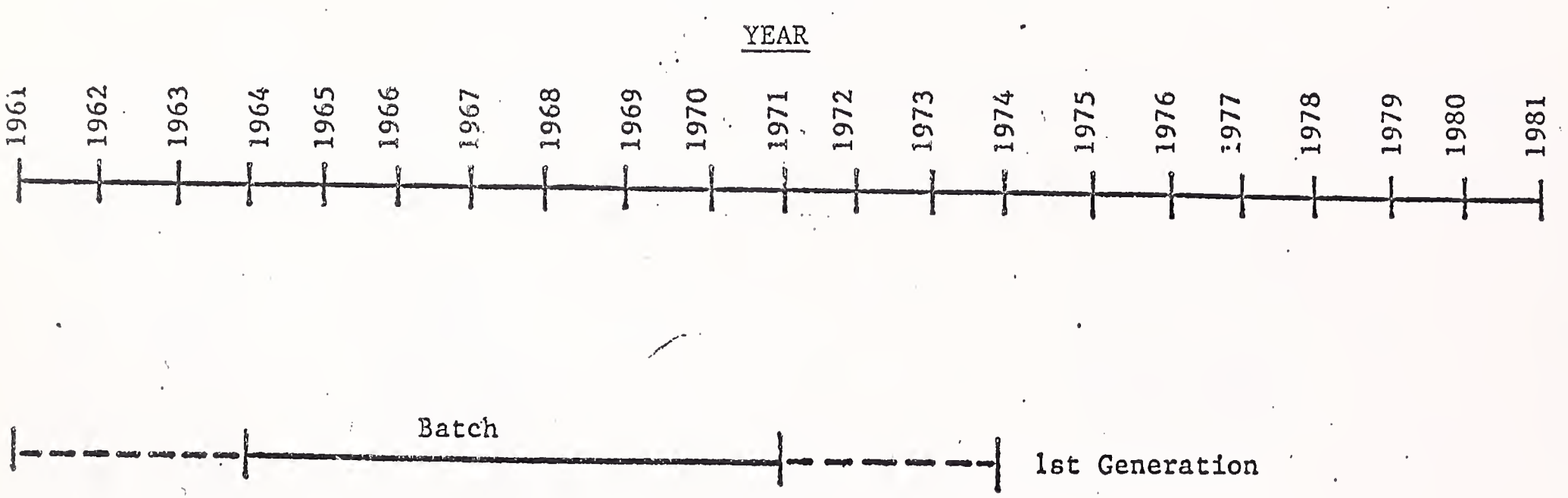
- IMPACTS
  - MINIS.
  - DBMS
  - USERS' ROLE
  - COMMUNICATIONS (CONSULTING)
- INDUSTRIES
  - FEDERAL GOVERNMENT ($555 M 1981)
  - BANKING & FINANCE (18% GROWTH)
  - RETAIL (19% GROWTH)

PROFESSIONAL SERVICES

- REASONS FOR GROWTH
  - EXPERTISE
  - INCREASING COMPLEXITY/DEMAND
- USER NEEDS
  - ON-LINE SYSTEMS
  - DATA BASE
  - CPE (CONSULTING)

INPUT

EXHIBIT V-37

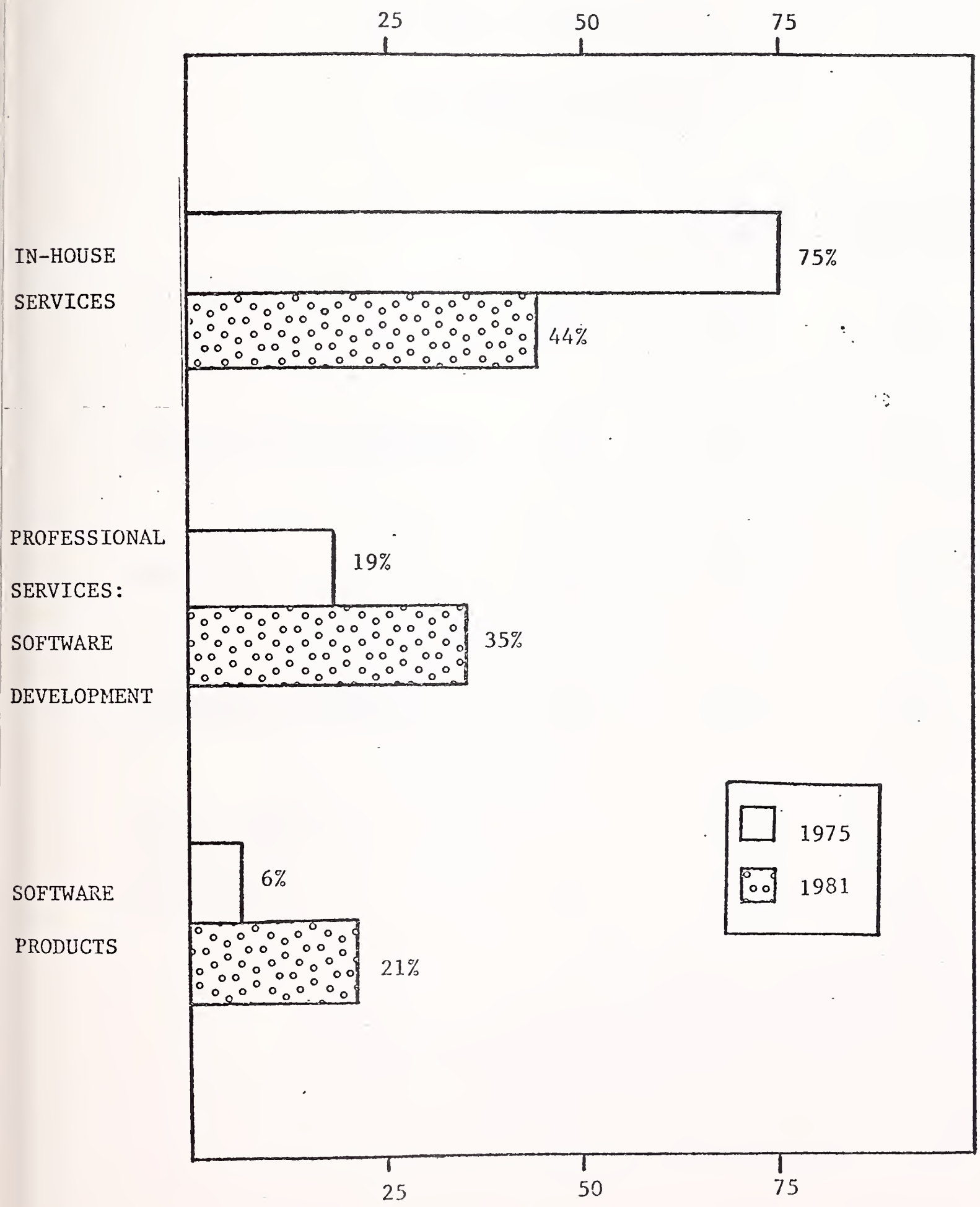


Applications Software Development Cycles

EXHIBIT IV-9

User Expenditure Forecasts by

Source of Applications Software, 1975 - 1981



% of Total of User Applications Software Expenditures

EDP BUDGET GROWTH RATES

BY INDUSTRY SECTOR

	1975/76	1976/77	1977/81
INSURANCE	13%	10%	7%
DIVERSIFIED FINANCIAL	10	9	12
BANKING	12	8	7
FEDERAL GOVERNMENT	8	8	8
STATE AND LOCAL GOVERNMENT	13	9	11

EDP BUDGET GROWTH RATES

BY INDUSTRY SECTOR

('CONT)

	1975/76	1976/77	1977/81
RETAIL	4%	2%	3%
DISCRETE MANUFACTURING	9	10	11
PROCESS MANUFACTURING	12	12	12
TRANSPORTATION	10	9	11
UTILITIES	10	9	9
AVERAGE	12%	10%	9%

BANKING

- EDP - COMPETITIVE FACTOR

- COST (INCLUDING THAT OF EFTS)
  - FIRST CONCERN OF EXECUTIVES

- COMMUNICATIONS REQUIREMENTS
  - CUSTOM NETWORK SOFTWARE COMMON
  - DATA SEPARATE FROM VOICE/ADMINISTRATIVE COMMUNICATIONS
  - BELL USERS

- PROBLEMS/OBJECTIVES/DEVELOPMENTS
  - PROGRAMMER PRODUCTIVITY
  - EDUCATING USERS
  - ON-LINE SYSTEMS
  - AUDIO RESPONSE SYSTEMS

CHANGES FORESEEN

- REMOTE BANKING
- CHANGING BRANCH STRUCTURES
- CONSUMER BANKING
- BANKS REACT TO CHANGE

USE OF SERVICES

- 30% WOULD CONSIDER FM
- PROCESSING/SOFTWARE USED AT ALL SIZES
- SECONDARY PROCESSING MAJOR MARKET
- CORRESPONDENT BANKING VERY COMPETITIVE

BANKING ACTIVITY

- MOLL - SDC
- WEILAND - SBC
- FCS - ADP
- ACS - MERCANTILE BANK
  - GREYHOUND (SOFTWARE)
- OSI - ENTRY

EXHIBIT VI-9

Major Competitors In The

Bank Computer Services Market

	BANK SIZE			
TYPE OF SERVICE	VERY LARGE	LARGE	MEDIUM	SMALL
In-House Processing Processing Services (FM, RCS, Batch)	EDS UCC Systematics CSC CUC MMDS (FIS) BCS	EDS Systematics UCC Metridata ACS Bradford CSC	EDS Metridata National Sharedata Systematics Weiland/SBC ADP/FCS ACTS	National Sharedata BCS/Leader Weiland/SBC ITEL ADP/FCS Greyhound CDC Moll Colorado Computer Corp.
Correspondent Banking Processing Services	National Sharedata Bradford	National Sharedata Weiland Systematics Bradford	National Sharedata ACS Weiland Systematics	
Processing In-Bank Software	UCC EDS Bradford	UCC Florida Software EDS Bradford (MSA) (Kranzley)	MSA Florida Software Kranzley ACS GCS (Weiland)	MSA (Florida Software) (IBM) *
Correspondent Banking Software	Weiland Florida Software ACS GCS	ACS Weiland GCS		

* = Potential

INSURANCE

- EDP NOT AS CRITICAL AS IN BANKING
- RETURN ON INVESTMENT KEY
- ON-LINE SYSTEMS - "A TERMINAL IN EVERY OFFICE"
- BASIC APPLICATIONS BEING CHANGED TO NEW ENVIRONMENT
- FAIRLY RECEPTIVE TO OUTSIDE SERVICES
- OFFICE AUTOMATION FAIRLY WELL INTEGRATED
- PROBLEMS
  - LACK OF STANDARDS
  - PROVIDING REMOTE COMPUTING CAPABILITIES

MANUFACTURING

- APPLICATIONS SOFTWARE KEY
  - SMALL/MEDIUM USERS
- FM
  - MEDIUM SIZE COMPANIES
- RCS
  - ALL SIZES
- EDP RELATIVELY LOW IMPORTANCE EXCEPT
  - CUSTOMER INTERFACE
  - PRODUCTION CONTROL

- 'ON-LINE' SYSTEMS
  - EXPEDITING
  - ORDER-ENTRY (DISTRIBUTION)
- COMPETITIVE/NO DOMINANT VENDOR
  - XCS
  - DISTRONICS
  - KEYDATA

PETROLEUM INDUSTRY

	1976	1981	AAGR
• REVENUES	250K		
• EDP EXPENDITURES	1,800	2,900	
• COMPUTER SERVICES	96	194	15
— REMOTE COMPUTING	61	141	18
— SOFTWARE PRODUCTS	15	26	12
	($ MILLIONS)		(%)

PETROLEUM INDUSTRY

KEY OBSERVATIONS

- VERY LARGE IN-HOUSE EDP RESOURCES
- EDP CENTERS AND MANAGEMENT DECENTRALIZED
- NO CENTRAL CONTROL OF SERVICES EXPENDITURES
- SERVICES PURCHASING CAPABILITY AT ALL LEVELS
- MAIN SERVICES APPLICATIONS ARE SPECIALIZED
  - SEISMIC DATA PROCESSING IS #1
- SOFTWARE PRODUCTS IN COMBINATION WITH REMOTE COMPUTING IS KEY TO MARKETING SERVICES

PETROLEUM INDUSTRY

TRENDS

- CONTINUED EDP AND ORGANIZATIONAL DECENTRALIZATION TO MINIMIZE IMPACT OF POSSIBLE DIVESTITURE LEGISLATION

- MOVEMENT IN-HOUSE OF FINANCIAL AND CREDIT CARD APPLICATIONS

- INCREASED USE OF SERVICES FOR HIGH TECHNOLOGY APPLICATIONS AND GOVERNMENT REPORTING

- MINICOMPUTERS WILL INCREASE USE IN PROCESS CONTROL, CODE CONVERSION, AND DEDICATED APPLICATIONS

PETROLEUM INDUSTRY

EXPENDITURES BY TYPE OF SERVICE

	1976	1981	AAGR
GENERAL BUSINESS	$12 M	$30 M	20%
SCIENTIFIC	16	34	16
SPECIALITY	26	65	20
UTILITY	24	32	6
TOTAL	$76 M	$161 M	16%

TRANSPORTATION

- AIRLINES
  - OTHER AIRLINES
  - COMPLEX APPLICATIONS
  - 'PULL THROUGH' CONTRACTS
- MOTOR FREIGHT
  - LOCAL BATCH
  - LOW EDP COST
  - REGULATED
- OPPORTUNITIES
  - AIRLINES CONSOLIDATING
  - MOTOR FREIGHT BILLING
  - RATE APPLICATION SUPPORT

MEDICAL

- IMPACTS
  - GOVERNMENT REGULATION
  - COSTS
  - HMOs NOT GROWN
  - MEDICAID/MEDICARE/NHI
- SOFTWARE PRODUCTS (TURNKEY SYSTEMS)
  - SMALL HOSPITALS
  - ACCOUNTING/CONTROL

- RCS INTERFACE WITH MINIS
- BATCH
  - PROFESSIONAL COMPANIES
- FM
  'PULL THROUGH' FROM HOSPITAL MANAGEMENT
- COMPETITION
  - BANKS
  - COMPUTER MANUFACTURERS
  - SERVICE COMPANIES

UTILITIES

- TELEPHONE COMPANIES MARKET
  - $60 M RCS IN 1975
  - LARGE CONTRACTS
  - COST CONTROL
- DEVELOPMENTS
  - AT&T COMPETITION
  - IN-HOUSE CONTRACTS
- POWER AND GAS COMPANIES
  - LIKE GOVERNMENT
  - NUCLEAR POWER OFF
  - MINING ACTIVITY RESULTS
  - BILLING SYSTEMS NEEDED

STATE AND LOCAL GOVERNMENT

- NO CONSISTENT CHANGE PATTERNS
- SOME CONCERN/INTEREST IN DISTRIBUTED PROCESSING
- SOFTWARE IS SHARED INCREASINGLY
- FEDERAL GRANTS PROGRAMS SUPPORT HARDWARE PROCUREMENTS
- LITTLE EDP CONTROL OVER COMMUNICATIONS
- STATES OPPOSED TO OUTSIDE SERVICES USE
- NO CONSISTENT APPLICATIONS PATTERN
- FM TOO COMPETITIVE

EDUCATION

- SMALL BASE - POTENTIAL IN HIGHER EDUCATION

- "SHARING" BECOMING MORE COMMON
  - OPPORTUNITY FOR "CORRESPONDENT" EDUCATION SERVICES
  - FM OPPORTUNITY, INVOLVING RESALE

- FEDERAL GRANTS MAJOR FACTOR TO MANY SCHOOLS

- STATE AND LOCAL GOVERNMENT
  - 'SHARING'
  - FEDERAL GRANTS PROGRAMS
  - FM (TOO COMPETITIVE)

- SERVICES INDUSTRIES
  - CONSOLIDATING
  - ROLE CHANGING
  - HIGH PEOPLE COSTS
  - 'INFORMATION PROCESSING'

- FEDERAL GOVERNMENT
  - EMPHASIS ON SERVICES
  - DECISION AS TO WHAT TO CONTRACT OUT:
    - EDP FUNCTION (PROGRAMMING),
    - APPLICATION (PAYROLL),
    - OPERATING UNIT
    - AGENCY

- RETAIL
  - ON-LINE SYSTEMS
  - CREDIT
  - LOW-BASE

- WHOLESALE
  - ON-LINE DISTRIBUTION FUNCTIONS
  - LARGER ONES NEED MORE THAN STANDARD PACKAGES

- OTHER INDUSTRIES
  - RECOMMENDED AREAS
  - PEOPLE RELATED

COMPETITION

COMPETITION

IBM

- 'HARDWARE ENHANCEMENT' FOR MEDIUM SIZED ORGANIZATIONS
- INDUSTRY SERVICES BASED ON COMMUNICATIONS
- POSSIBLY MEDICAID/MEDICARE EDUCATION
- IN ENGLAND STRUCTURED FOR MAJOR PUSH

  5 x 168 = $50 MILLION.

- SUCCESSFUL IN-SPITE OF THEMSELVES
- USE SERVICES TO SELL TERMINALS/HARDWARE.

AT & T

- INDUSTRY SERVICES BASED ON COMMUNICATIONS
- INTERNALLY MOVING TO REDUCE EXTERNAL RCS RELIANCE
- NOT SERVICE ORIENTED
- NOT SALES ORIENTED
- PROBLEMS OF FRAGMENTED STRUCTURE.
  - 23 BELL COMPANIES
  - ESTERN ELECTRIC
  - BELL LABS
  - AT & T
- OTHER COMMUNICATIONS COMPANIES
  - VANS
  - GTE/ITT
  - WESTERN UNION

COMPETITION

- SEVERAL INDEPENDENT COMPANIES WILL BE APPROXIMATELY $500 MILLION BY 1980

- SPIN-OFFS WILL CHANGE:
  - SOME WILL GET OUT
  - SOME WILL MOVE IN

- COMPUTER MANUFACTURES WILL INTEGRATE COMPUTER HARDWARE AND SERVICES

- IBM IS THE WORLD'S LARGEST COMPUTER SERVICES VENDOR

- CDC IS PUSHING HARD

REVENUES PER EMPLOYEE

RCS	$44,000
SOFTWARE PRODUCTS	42,000
PROFESSIONAL SERVICES	30,400
BATCH	24,500
FM	24,200
MSVs	23,600

SOME LEADING VENDORS

COMPANY	1980 COMPUTER SERVICES REVENUES ($ MILLIONS)	AVERAGE ANNUAL GROWTH RATE
ADP	500	25%
CDC	600	15%
CSC	500	20%
GEIS	500	25%
MCAUTO	125	20%
TYMSHARE	220	30%
XEROX	100	40%

ADP

	FY 74	FY 75	FY 76
REVENUES	123	155	188
PROFITS (IBT)	23	27	35

($ MILLIONS)

SPECIALIZATION:

INDUSTRY
- ALL (GENERAL BUSINESS)
- FINANCE

SERVICES
- BATCH
- RCS (CYPHERNETICS)

NOTES
- USE OF MINIS.
- 20% GROWTH & ACQUISITIONS
- INTERNATIONAL

CDC DATA SERVICES

SEGMENTS:
- SBC ($100 M)
- CYBERNET ($80 M)
- ARBITRON ($25 M)
- PROFESSIONAL SERVICES ($40 M)

SPECIALIZATION:

INDUSTRY
- ALL
- MANUFACTURING (CDC)
- UTILITIES (CDC)
- BANKS (SBC)
- GOVERNMENT (CDC)

SERVICES
- ALL SAVE FM
- SBC (RCS/BATCH)

NOTES
- REORGANIZED
- DIVERSIFIED
- COMMERCIAL CREDIT

BRADFORD

	FY 74	FY 75
REVENUES	59	67
PROFITS (IBT)	5	9

($ MILLIONS)

SPECIALIZATION:

INDUSTRY
- BANKING (TRUST & OPERATIONS)
- GOVERNMENT

SERVICES
- FM
- BATCH

NOTES
- GEOGRAPHICALLY CONCENTRATED
- DOMINANT

CSC

	FY 74	FY 75	FY 76
REVENUES	147	177	220
PROFITS (IBT)	2	7	15

($ MILLIONS)

SPECIALIZATION:

INDUSTRY	•	FEDERAL GOVERNMENT
	•	STATE & LOCAL GOVERNMENT
	•	BANKING
SERVICES	•	RCS
	•	FM
	•	SOFTWARE
NOTES	•	SYSTEM CONTRACTS
	•	ACQUISITIONS

EDS

	FY 74	FY 75	FY 76
REVENUES	119	124	133
PROFITS (IBT)	29	27	14

($ MILLIONS)

SPECIALIZATION:

INDUSTRY
- INSURANCE (HEALTH AND LIFE)
- BANKING

SERVICES
- FM
- SOFTWARE DEVELOPMENT

NOTES
- PROGRAM MANAGEMENT MEDICAID
- LARGE CONTRACT DEPENDENT
- INSULAR
- EMPHASIZING RFM

CONCLUSION